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Conducted by

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Patton's Spruce.

BY the increasing number of travelers who explore the high mountains of the Pacific states, which are its only home, the lovely Mountain Hemlock is now usually known as Patton's Spruce. Perhaps best considered a Hemlock, this tree differs from other Hemlocks in its long, narrow cones and in its more acute leaves usually keeled on the upper surface, and its bilobed pollen grains; and in general appearance it is one of the most distinct and beautiful of the North American conifers.

Tsuga Pattoniana, as botanists call this tree, was discovered only about forty-five years ago near Mount Baker, in northern Washington, by the Scotch collector Jeffrey, and was named out of compliment to George Patton, a Scotch lawyer, who was given to the cultivation of exotic trees, and was one of the subscribers to the fund which enabled Jeffrey to explore the forests of north-western America.

Patton's Spruce is now known to range from Alaska, where it grows at the level of the sea, southward along the mountain ranges of British Columbia, west of the continental divide, the two slopes of the Cascade Mountains of Washington and Oregon and the California Sierra Nevada, where probably on the upper waters of some of the tributaries of King's River it finds its most southern home. It is a tree of high altitudes; and, except at the extreme north, it is found only near the timber-line, forming with *Pinus albicaulis* and *Abies lasiocarpa* extensive forests.

Patton's Spruce is a tree of marvelous grace, with drooping branches clothed with thickly clustered leaves, abundant elongated narrow cones, which hang on slender spray-like branchlets, and on some individuals are bright purple, and light yellow on others in the same grove. The foliage, too, differs in color, being on some trees dark green and on others light blue-green, a peculiarity which has led to some confusion of nomenclature, the blue-leaf form often appearing in gardens as *Tsuga* (or *Abies*) *Hookeriana*.

Patton's Spruce grows in the greatest perfection on the slopes below Crater Lake, in the Cascade Mountains of southern Oregon, forming here extensive and nearly pure forests, in which individual trees one hundred feet high, with stout massive stems five or six feet in diameter, are

abundant. Such a growth is probably not exceptional, and this tree is abundant and conspicuous at the timber-line of Mount Hood, Mount Ranier, and on the Selkirk and other mountains of British Columbia. On Mount Ranier, with *Abies amabilis* and *Abies lasiocarpa*, it forms a large part of the forest growth, growing above the banks of glaciers in great luxuriance. Some idea of the upper forest-belt on Ranier can be obtained from our illustrations in this issue; that on page 6 displays the snow-covered summit rising 8,000 feet above the timber-line, with scattered trees of Patton's Spruce on the slope in the foreground, and in the illustration on page 7 the trunks of this tree are displayed in more detail.

In Washington and Oregon Patton's Spruce grows at elevations of from 5,000 to 6,000 feet above the sea-level, but farther south the timber-line is carried higher, and John Muir, who describes this tree in his *Mountains of California* as the "most singularly beautiful of all the California conifers," found it growing on the Sierras up to 10,000 feet altitude; and on the edge of Lake Hollow, at an elevation of 9,200 feet, measured a trunk nineteen feet seven inches in circumference at four feet above the ground. "No other of our alpine conifers," he tells us, "so finely veils its strength. Its delicate branches yield to the mountain's gentle breeze, yet it is strong to meet the wildest onsets of the gale—strong not in resistance, but in compliance, bowing snow-laden to the ground, gracefully accepting burial, month after month, in the darkness beneath the heavy mantle of winter. Every tree-lover is sure to regard it with special admiration. Apathetic miners, ever seeking only gain or gold, stop to gaze on first meeting it, and mutter to themselves 'That is a mighty pretty tree.' The deer love to lie down beneath its spreading branches; bright streams from the snow that is always near ripple through its groves, and *Bryanthus* spreads precious carpets in its shade. But the best words only hint its charms."

Introduced into Scotch plantations by its discoverer, Patton's Spruce has shown that it is fairly adaptable to altered climatic conditions, and it may now be seen in many European collections, and although it has not yet had sufficient time to attain maturity in cultivation, it is an ornamental tree of much promise in several European countries. Patton's Spruce, moreover, is one of the comparatively small number of the conifers of the Pacific states which thrive in the east, and although, like most alpine conifers, it grows extremely slowly at the sea-level, it has for several years withstood without injury the changeable winters and dry summers of the New England climate.

The Planting of Shrubberies.

IN furnishing small areas about modest country and suburban houses, and, indeed, for a great many other purposes in larger and more pretentious grounds, public and private, deciduous flowering shrubs are so effective in this climate that every one who wishes to plant intelligently should be familiar with their habits and with the proper way of disposing them. Of course, no place except the very smallest can dispense with trees, and in many places low-growing evergreens, especially the broad-leaved evergreens, can also be used with profit. But when we consider the beauty and variety of their flowers and foliage and fruit, and the mist of soft color which hovers about their twigs in winter, deciduous shrubs are, beyond all question, the most important element in planting small grounds. This does not mean that all shrub plantations are satisfactory, for individual plants can be dotted about a lawn in a way that is utterly meaningless. They can be used, however, so as to make a picture which has individuality and character, and in which every detail contributes distinctly to the general impression and helps to bring it out in a clear and well-defined way.

This is an art which requires study and practice, and a bulletin lately issued by Professor Bailey, of the Cornell

Experiment Station, entitled *Suggestions for the Planting of Shrubbery*, will be found useful to novices and to many who are not altogether without experience. This little pamphlet, which lays down many sound principles, illustrated in a helpful way by half-tone pictures, shows at the outset an example of the common or nursery type of planting, in which each tree and shrub is treated as a disconnected individual, and a contrasting one in which the same materials are massed about the borders of the same lawn so as to make a satisfying and consistent picture. The point emphasized is that the value of the shrubbery lies primarily in the effect of the mass, and not of the separate shrubs. Illustrations are given to show how effective a natural copse may be when it stretches across a vale on the further border of a meadow, which it makes more beautiful by the mystery of its boundary. Nature's irregular planting of this sort is always interesting because of its attractive sky-line and the wonderful play of light and shadow on the masses of foliage that advance in promontories or retreat in quiet bays, with the greensward flowing about and among them like the waters of a lake rippling along a picturesque shore. The beauty of such a boundary is not fully appreciated until we study examples of another kind, and it is emphasized in this pamphlet by the picture of shrubbery in a city lot where each plant is pruned to a definite form with its outline sharp and hard, a practice which is utterly destructive of the continuous flow of form and color which makes a natural copse so delightful. Nothing is gained by planting shrubs in masses unless the plants are allowed to mingle so that the attention is not arrested by individuals. After this principle is established it is logical to insist on the elementary rule that for small places there should be a central open space without sharply defined limits, but with a natural or apparently unstudied border; that any arrangement which gives a patchy effect should be avoided, and that shrubs should be eschewed which are only interesting for their curious forms or singular colors.

Now, what class of shrubs is the most desirable? Different persons will have various preferences, but the main point is to be sure that the bulk of the planting consists of hardy and vigorous species, and for this nothing better can be chosen than many of our native species. Every planter who has room for Roses will plant them somewhere, but the foliage and habits of garden Roses are not such as give them value in a shrub border, although some of the species, like the Japanese *Rosa rugosa*, have distinct merit in a mass. There is no fear that our wild shrubs will look common when transferred from the woods to the lawn, for they develop such beauty under cultivation that those alone who are well acquainted with them will recognize them as the natives of our roadsides and wood borders. Of course, no one can plant effectively unless he has an affectionate regard for the shrubs he uses, and any one who establishes intimate relations with nature has the tenderest feeling for the wild things that he finds struggling for life along brook-sides and in the corners of pasture lots. This is why our native shrubs are always good for homelike pictures, and although we may take some interest in the variegated foliage and the weeping habit of the sports which are for sale in the nurseries, the greatest satisfaction will come from a sympathetic use of our own wild shrubs.

We commend this little pamphlet to our readers, not so much for its specific directions as for its general temper and the foundation principles which it lays down. One cultural rule, however, we are glad to see insisted on. This rule is, that in making a shrub group the holes for the bushes should not be made in the sod, but the entire area should be deeply spaded and the shrubs set in thickly. If small shrubs are set closely, say, eighteen inches or two feet apart, there will be no danger of a display of bare earth, for the whole surface will be practically covered with a carpet of green the first year. Under this plan, too, the plants can be hoed, and this stirring of the soil will

cause a much stronger growth, while just as soon as the plants begin to crowd each other they can be lifted from what is practically a home-made nursery. In this way the planter has not only a shrub garden at once, but he has a reserve garden in which for several years he can find supplies of the very best material for use in other places. Professor Bailey says that the man who plants his shrubs in holes in the sward does not seriously mean to make any foliage-mass, and it is likely that he does not know the value of broad masses in artistic planting. Where large shrubs have open spaces between them, some low-growing, procumbent species, like the hardy *Vinca* or *Evonymus obovatus*, may be planted, but all this is another matter. The rule for continuous cultivating in shrub groups is sound in theory, and it has proved of great advantage in practice in many places.

An Outline of a Course in Horticulture.

THE first question which confronts every teacher of horticulture is: What shall be included in horticultural instruction? Shall the course be restricted to the so-called practical problems attending the propagation of fruits and vegetables, or shall it be made to include the wider field of landscape-gardening and plant-breeding, and the application of the laws of vegetable physiology? Shall we study the art of raising plants, or shall we consider the principles on which the art is founded?

For my own part, I should not regard with favor a course in horticulture which is restricted to the mechanical operations of the propagation and culture of plants. The student should know something of the origin, habits and relationships of plants, also of the causes of variation and the effects likely to be produced by the operations he may perform. In other words, he should know something about plants and their amelioration, as well as something about their cultivation. For this reason, as well as to train the powers of observation, thorough knowledge of systematic, structural and physiological botany should be at the foundation of every course in horticulture.

A knowledge of agricultural chemistry, of elementary physics and of soils is also essential, for reasons which are apparent, and this work should precede technical instruction in horticulture. Accepting this view, no course in horticulture should be offered before the junior year in our colleges.

Beginning with the junior year a twelve or sixteen weeks' course in pomology may well be introduced. The student will at this time have had sufficient training in botany to understand the necessary discussions of the distinguishing characters and the relationships of the fruits studied, while the season is favorable for a field study of orchard fruits and grapes, with special reference to harvesting and marketing. The propagation and culture of many kinds of fruits may also be studied in a practical way at this time. In some sections the season will be too far advanced for budding, but the making of hardwood cuttings, and the pruning and preparing of plants for winter, afford abundant opportunity for illustration during the whole term. The subject of pomology is naturally treated under three sub-heads, viticulture, small-fruit culture and orchard culture. In some sections a fourth—nut culture—might well be added. Certain general principles may be stated which will hold in each of the divisions of the subject; then the various fruits included in each may be treated specifically. The scheme adopted in my own work is similar to that of Bailey, at Cornell, and is somewhat as follows: (1) Botanical; (2) History; (3) Importance and extent of cultivation; (4) Culture and management; (5) Harvesting, storing and marketing; (6) Propagation.

The winter term may profitably be devoted to greenhouse construction and management. This course should include a careful discussion of the evolution of the modern greenhouse and of the uses and details of construction of

the various forms of forcing structures. The physics of greenhouse roofs and the principles involved in the various methods of heating, as well as the mechanical operations of building and putting in heating and ventilating apparatus, should receive most careful attention. So far as practicable it has been found advantageous for students to visit commercial houses in the vicinity in order to make intelligent comparisons of the different methods employed. Practice in making designs and estimates for the construction of different styles of houses is of special importance in this connection.

In discussing the management of the houses, watering, ventilating, etc., the student's knowledge of physiological botany will be of practical value.

The spring is preëminently the time to take up the subject of vegetable gardening. Remarks concerning preliminary work for the course in pomology will apply to this course. In other words, a knowledge of botany, of soils, of drainage and of agricultural chemistry should precede the discussion of vegetable gardening. The general treatment of the subject at the Maine State College is somewhat similar to that outlined for the course in pomology. After some general notes on market gardening as a business and the extent of the industry, the leading garden vegetables are taken up in detail. As in the case of fruits, the vegetables naturally fall into several groups; root crops, or those in which roots or underground stems are edible; Cabbage-plants, the Solanums, the Cucurbits, the Alliums, etc. In studying the different groups the general characteristics are first given, together with a discussion of the distribution and relative importance of the various members. Then each species is treated in detail in the manner described for fruits. In this way the student gets a broader conception of the subject than is possible if no system be followed.

In the laboratory work which forms a part of this course, the student is made familiar with the different kinds of garden seeds, with methods of seed-testing, with soils and garden implements, as well as with the practical operations of planting, cultivating and marketing. The later operations may best be learned in detail when the student can devote his whole time to the work.

It is questionable whether, in the regular college course, more than one term may profitably be devoted to ornamental gardening. The leading object of such a course should be to arouse enthusiasm and a love for tasteful surroundings, with some ideas of the principles of taste, rather than to impart specific directions for the culture of certain species of plants. Naturally, the course should include directions as to the sources of information, and should, so far as possible, include practical demonstrations of the methods employed in managing different classes of plants. But, as a large majority of the students will be interested in this work only incidentally, it would seem that sixteen weeks is sufficient time for both landscape-gardening and floriculture. Here, however, as in all cases, local conditions must govern the policy adopted.

I should not regard the course as complete unless at least one term were devoted to a systematic study of plant-breeding. This study would properly include a consideration of the origin and distribution of cultivated plants; their variation as effected by soil, climate and cultivation; the influence of heredity, the principles of selection, the methods and effects of crossing, etc. In such a course the student may obtain some idea of the possibilities in the direction of scientific horticulture.

The remaining term of the senior year may profitably be spent in the investigation of special problems and in a study of horticultural literature. This course, as also the one in plant-breeding, would naturally be made elective. Laboratory work and collateral reading should be made important features of every course in horticulture, as it is a well-recognized fact that the student retains more lasting impressions from demonstrations than from the most carefully prepared lectures. The laboratory work should, how-

ever, be accompanied by informal discussions as thoroughly systematized as the class-room instruction, and, as far as possible, should follow the same lines as those taken up in the lectures.

The foregoing notes are intended to invite discussion concerning the purpose and scope of horticultural instruction, as well as methods of teaching, rather than as a contribution of special significance. In brief, however, my ideas on the subject are here given.

Maine State College.

W. M. Munson.

Three Natural Parks.

THE cities of Halifax, Truro and St. John, in the maritime provinces of Canada, are the possessors of parks of great natural beauty, each typical of the bold and rugged scenery which prevails on the adjacent coasts, and each one almost in its natural state. Point Pleasant Park, the oldest of the three, and formerly called Tower Woods, is on a point of land at the lower extremity of the magnificent harbor, stretching along the water-front and looking out upon the Atlantic Ocean. It occupies the entire southern end of the peninsula on which Halifax is built, and extends from the harbor on the one side to the Northwest Arm, and comprises about 180 acres, the highest point being some 150 feet above the sea. Except for the eight miles of road built through it, and many delightful foot-paths, it is entirely covered with forest. The property belongs to the Imperial Government, but the city has a perpetual lease and free use of it on the conditions that no buildings are to be put on it, and no wharves or traffic allowed on its shores, while the forts, of which there are several, are to remain under the control of the Imperial Government. The park is in charge of twelve commissioners appointed by the City Council, five of whom are permanent, the others being the Mayor and six Aldermen, who hold the position until their terms in the City Council expire. The city appropriates the modest sum of \$2,500 a year for the maintenance of the park. Of course, the commissioners are not paid, but the chairman devotes much of his time to the park as a labor of love. The main effort is to keep it essentially in forest and preserve its natural features. When the park was first begun, Prince Edward, the father of Queen Victoria, did much to beautify it, and his example has been followed by other distinguished commanders at Halifax since his time. The excellent roads are made chiefly by the soldiers. Except the fine iron gates at the entrance of the park, which, with considerable money to open the avenue to it, were a gift from the late Sir William Young, and a handsome keeper's lodge, in the course of erection, there is very little artificial work in this oldest of the parks of Canada. It is practically a magnificent grove of trees, making a typical forest of eastern Canada. During the last few years the commissioners have set out many young exotic trees and shrubs, but the native species have been so well preserved and kept in such prominence that the visitor finds it difficult to believe that he is not in a well-preserved natural forest. The fine Public Gardens of Halifax are not a part of the park, but are managed by a separate board.

The Victoria Park, at Truro, Nova Scotia, was founded about ten years ago, in the Queen's Jubilee year. Its situation and surroundings are romantic in the extreme. From a plateau at the top of a range of hills on the southern side of the city a stream flows down in a succession of cascades, forming a ravine which extends almost to the city limits. The stream finds its way through this ravine, now bounding over rocky ledges, now dimpling in foamy pools, until it enters a little glen, bordered with evergreen trees, about a quarter of a mile from the city. Here is the entrance to the park, rather sombre even on a bright October day, but when once the visitor enters the gorge the romantic beauty of the scene is one well fitted to captivate him. A path follows the windings of the stream for some distance, giving new views of picturesque scenery at every turn. Here a bare wall of red sandstone towers above the path for

nearly a hundred feet. On the opposite sides of the chasm the wall of rock is broken, and from the crevices are seen hanging in rich profusion such Ferns as Woodsias, Polypodium and Aspidiums, far beyond the reach of human hands. Here and there is some little dell, through which bubbles a miniature stream, its rocky banks covered with Mosses and Lichens. The largest of the falls has been named the Joe Howe Falls; it is about thirty or forty feet in height. On the bluff near by, it is proposed to erect a monument to the distinguished Nova Scotian after whom it is named; but it is to be hoped that the projectors will change their minds and either erect the monument near the entrance to the park or in the city. Any work of ornamentation in such a picturesque place would certainly be a blot. On the plateau, 200 feet above the ravine, a carriage-road extends, encircling the outer edge of the park, and numberless bypaths extend from this to points of vantage on the crags overlooking waterfalls, where on a bright October afternoon the visitor looks down on a scene of marvelous beauty, the gorgeous tints of Maples, Viburnums and Heaths darkened now by the sombre hue of evergreens, now lightened by the foam of waterfalls.

Mount Pleasant Park, at St. John, New Brunswick, situated near the city, has not yet been formally opened. It consists of 240 acres of land, some of which has been given by liberal citizens, some acquired by purchase, and some will come by expropriation. During the past two years the members of the Horticultural Association have endeavored in every possible way to interest citizens in the park scheme by planting the squares of the city with trees and flowers, and by holding exhibitions. When they have secured enough land for the park and have paid for it, the association proposes to hand it over to the city as a gift. It is hoped that the liberality and public spirit of these citizens will meet with a generous response on the part of the city government. The park site is a broken and picturesque plateau overlooking the city, intersected with ravines. A lake lies at its western extremity, from the eastern end of which a small stream finds its way over a succession of perpendicular rocks to the meadow below—forming a series of beautiful cascades about eighty feet in height. The most of the park lands so far acquired consist mainly of rocky hills and mounds covered with a growth of small shrubs, with stunted Spruces, Firs, White Birches, Maples and Cedars. The Cedars are shapely and beautiful, and if carefully handled will become one of the most beautiful ornaments of the park, the limestone formation being well adapted for their symmetrical growth. A roadway has been constructed around the lake, and it is hoped that the services of a competent landscape-gardener may be secured before anything more is undertaken. It would be a pity to go on blindly without a completed design, and a design which respects the peculiar charm of the place and which preserves and enhances it. A special feature of the park at this season is the native shrubbery which covers the rocks, and which yields the most brilliant and varied colors—stunted Vacciniums with their purple hues covering the rocks in every direction; several species of Viburnum, with their white and blue fruits in pleasing contrast, Kalmia angustifolia, Rhododendron Rhodora, Sedum latifolium, Pyrus nigra, and many others.

St. John, N. B.

G. U. Hay.

Plant Notes.

The Lilies of our Pacific Coast.

THE Pacific coast of the United States is wonderfully rich in members of the Lily family. With nearly forty Calochorti, over twenty Brodiaeas and thirty Alliums, nine Fritillarias and ten Erythroniums, as many or more Liliums, and fifty other species distributed among twenty-five genera, the Liliaceae of the Pacific slope include a grand total of over one hundred and seventy species, in a vast and comparatively unknown region, the exploration of which annually adds new species or proves the existence

of forms described by the earlier botanists and since lost sight of. I doubt if there is any other region in the world where the Lily family is so rich and varied.

The number of Liliums or true Lilies on the Coast varies according to the nomenclature followed. *The Botany of California*, published in 1880, mentions eight species and one variety. Mr. Baker more correctly, as I think, distributes the same material into fifteen species and varieties in his synopsis of the genus. These species can be divided into several groups according to their natural affinities. *Lilium Washingtonianum* and its varieties, with the nearly related *L. rubescens*, will form the first of these groups, and into the second will naturally fall *L. Columbianum*, *L. Humboldtii* and its varieties, and *L. Bloomerianum*, which is also known as *L. Humboldtii*, var. *ocellatum*. *L. Bolanderi*, too, shares in the solid ovoid bulb and leaf character of this group, although its flowers differ in form.

A third group, and a very large one it is, will contain the western relatives of *Lilium superbum*, large bog Lilies with rhizomatous roots and revolute flowers. These are *L. pardalinum*, *L. Roezlii* and *L. Warei*, with the innumerable forms of *L. pardalinum*, some of which, as *L. Californicum*, *L. Bourgæi* and *L. puberulum*, are often treated as species. This wonderfully varied group is connected by a close chain of intermediate forms, possibly crosses, with the next group, which consists of the western relatives of *L. Canadense*. In this group of small-flowered bog Lilies, *L. parvum* is nearly as various in its forms as is *L. pardalinum*, but *L. maritimum* is, as far as my observation goes, strictly monotypic. The type of *L. parvum* and *L. maritimum* have funnel-formed flowers.

Lilium Parryi is closely related to the *Pardalinum* group, differing only in having trumpet-shaped flowers. In growth it can hardly be distinguished from *L. pardalinum*.

Of these eleven species, *Lilium pardalinum* is most widely distributed, being scattered from central California to British Columbia, and eastwardly to the shores of Lake Winnipeg. *L. Washingtonianum* inhabits a long and narrow belt in the main Sierra Nevada range and in the Cascades to British America. *L. Parryi* is found in Arizona as well as in its original location in southern California, and *L. Columbianum* is found to extend far east of the Cascades in the Columbia River valley, but with these exceptions these Lilies belong to the mountainous regions of the Pacific Coast proper in the Sierra Nevada and Coast ranges. I have already written of *L. Washingtonianum* and its varieties (vol. ix., p. 448), and of *L. rubescens* (vol. ix., p. 493). In an early issue I hope to write of *L. Humboldtii* and its allies.

Ukiah, Calif.

Carl Purdy.

Cultural Department.

Notes on Cypripediums.

AT no period of the year is a good collection of Cypripediums entirely flowerless, but during the winter months when the temperature of the greenhouse is congenial they flower bountifully and their prolonged period of bloom gives opportunities for study and close acquaintance. It has been urged by some that Orchids out of flower are the reverse of ornamental, and this is true of some genera. Cypripediums, however, are rich in luxuriant leaf-growth, and not a few of them are worthy of cultivation for this feature alone, the deep green leaves being exquisitely marbled and variegated. Their growing popularity is attested by the fact that some of the more common species, like *C. insigne*, furnish cut flowers by the thousand for the New York market. To the amateur a little house of Cypripediums will give hours of infinite pleasure in winter, and hundreds of plants can be accommodated in a modest structure. The original wild species from many lands would of themselves furnish a rich store, but the hybrids of the last decade alone have here given us additional forms and colors in almost infinite variety. In fact, the hybrids are the majority among Cypripediums, and there is an endless fund of delight in comparing them, observing traits so plainly inherited that the parentage of many plants can be absolutely vouched for.

Cypripedium *insigne* is the type of quite an extensive family,

of which many members show marked improvements on the original. It is a native of Nepal, introduced early in the century, and now has over forty named varieties. One of the finest of these forms which we now have in flower is *C. insigne* Colsonianum, sent out from the Short Hills nursery. The very large dorsal sepal is the feature of the flower, the breadth and purity of its white margin being especially noticeable; in fact, nearly one-half of it is of this color, the base having the characteristic apple-green tint with prominent brown spots, the petals gracefully undulated, with the abundant spots disposed in a regular horizontal alignment. Of quite a different type is the dwarf variety *Eyermaonianum*. Its dorsal sepal is of a transparent greenish-yellow tipped with white, the petals and pouch also pale, unspotted, faintly lined, but the staminode is of a conspicuously rich yellow hue. *C. nitens*, a hybrid between parents *C. insigne* Maulei and *C. villosum*, is handsome and blooms freely. Its bold chocolate-spotted dorsal sepal shows the blood of *C. Maulei*; light brownish yellow petals, glistening like those of its other parent, are faintly lined with brown, infolding toward the polished light brown lip. Forms of the well-known hybrid *C. Leeaenum* are now numerous and most interesting. The characteristics of *C. Spicerianum* predominates in all these forms so much that there is little apparent trace of *C. insigne* Maulei, or the other parent *C. Maulei*. The best of the several forms we have is that known as *Masureelianum*, which was also sent out from the Short Hills nursery, and now has several fine flowers open. Its dorsal sepal is very large and of elegant curvature, recurving at the base till the edges overlap, and looking at the dorsal sepal from behind it is in shape a perfect miniature of the *Arum* Lily, in pure white. In front it is marked with broken lines and dots of light purple, but there is a broad margin of purest white. The *insigne* influence is apparent in the petals which, gracefully undulated along their edges, are brownish yellow, spotted with a darker brown pouch of a similar hue, but its inner surface pitted with innumerable tiny red dots. Other good forms of *C. Leeaenum* in flower are *Giganteum*, *Burfordense* and *Superbum*, all sufficiently distinct to justify their varietal names, while *Pulchellum* is quite a little gem with a neat flower, the dorsal sepal much contracted, green tinged and lightly spotted, the petals narrow and decidedly drooping, the pouch short, with a widely expanded aperture, while the staminode differs in color from the previous named forms and attracts notice in consequence by reason of its exquisite mauve color, the yellow protuberance in its centre standing out in rich contrast.

Cypripedium macropterum, a Veitchian production, is a hybrid between *C. Lowi* and *C. superbiens*. We have a noble scape of this, carrying two fine flowers and a bud yet to expand. The open flowers with their long horizontally poised petals measure nearly six inches across. The dorsal sepal is of a quaint shade of gray-green, lined and suffused with brown at its base. The petals are long, making a flower of graceful outline, as they depend somewhat at their tips, describing quite a semicircle. They are somewhat narrow at the base of attachment, but broaden toward their extremities, the broader half being of a light glistening, uniform mauve-purple, while the anterior portions are heavily dotted with shining black spots. The pouch is light brown. *C. Harrisianum* is as well adapted to grow in quantity for cutting as *C. insigne*, while some of its forms are highly conspicuous, as, for example, *Superbum*, a truly superb form in every respect. This has a very large dorsal sepal of exquisite coloring, a kind of mahogany-red in vertical lines running up the sepal over a lighter shade of purple-red diffused through the sepal, save a well-defined narrow margin of white. The petals are a rich purple-red in the upper half, but the lower portions much paler-tinted and faintly lined with green. The lip is prominent, of a claret-purple shading toward green at its tip. The variety *Pitcherianum* shows distinctive traits compared with its immediate relative.

Cypripedium Lawrenceanum, a Bornean species discovered by Burbridge in 1878, is a noble *Cypripedium*, as beautiful in leaf as in flower. It is represented in our collection by a very fine form, indeed, named *Giganteum*. Though a small plant, it carries an immense flower on a stout stem over one foot high. Its dorsal sepal is a study of rich coloring. Mainly white, it shades to light green at the base, while broad vertical lines of claret-purple of varying length streak the sepal, and their color is faintly diffused through the white body-ground. The petals are light green, ciliated along their edges, while half a dozen black spots are distributed along the upper and lower borders of both petals. The pouch is large, of a light brownish green, pitted inside with dark purple dots. *C. Niobe* *Shorthillense* flowers with great freedom, a plant in a three-inch pot carrying six perfect flowers. The influence of one of its parents, *C. Spicerianum*, is most marked in the dorsal sepal,

which is white, heavily lined and suffused with purple, the base of the sepal a brownish green. The petals have the graceful undulations and show characteristics of its other parent, *C. Fairreanum*. They are lined and suffused with chocolate on a greenish yellow ground, the short pouch glistening as though polished, being of the same tone of color. Another dainty gem of *Spicerianum* parentage is *C. Hebe*, which was raised at Short Hills; a tiny plant has two perfect flowers. It has a broad dorsal sepal, mainly white, but with a distinct band of purple right down the centre, and a few spots and suffusions of the same tint on the white ground color. It has short, narrow, wavy petals spotted with brown on greenish yellow, a short, broad pouch with infolding lobes, externally light chocolate, internally profusely red-spotted. *C. Arthurianum* is a lovely hybrid with *C. insigne* and *C. Fairreanum* for its parents. It is a dwarf grower, neat and free in flowering, its dorsal sepal bright green, tipped with pure white and penciled with brown in broken lines. Its wavy, drooping petals impart to the flower a graceful expression. They are lined and spotted with brown, the pouch also similarly tinted. Other *Cypripediums* of interest also in flower are *C. concinnum* *transparens*, quaintly colored in rosy purple and white, with a peculiar transparent lustre; *C. regale*, of marked distinctness, noteworthy for its clean-cut, regular form, its dorsal sepal tipped with white and streaked with dark olive-green, petals and pouch colored in a pretty harmony of brown and green; *C. luridum* in two forms; *C. Mrs. Edward Warren Hook*, with a polished purple-red flower of bright and attractive coloring, and *C. Tonso-villosum*, a comparatively colorless hybrid with fine flowers in subdued tones of brown, green and yellow.

Madison, N. J.

A. Herrington.

Nepenthes.

PITCHER-PLANTS are for the most part more interesting than showy. The flowers being inconspicuous, their chief beauty is in what is commonly called the pitchers. The genus comprises a considerable number of species and varieties, and the form or color of the pitchers constitutes the chief distinction, though they vary considerably in size, texture of leaf and vigor of growth. They are generally considered plants of easy culture, but this greatly depends upon the facilities. It is almost useless to attempt to grow them in an unsuitable house or in one in which the proper atmospheric conditions cannot be maintained. They require abundant atmospheric moisture at all times, but fresh air is also necessary. I have seen them grown in a house with a northern elevation, but one with a southern elevation is preferable, though, of course, it will require slightly more shade. This shading should in no case be overdone, for, in our experience, they have stood a greater amount of light than is usually allowed. It is only necessary to break off the strong sun rays, and for this purpose light muslin or cheesecloth is useful. The usual means of propagation is by cuttings. Several methods of striking are adopted, but the simplest and most convenient is to firmly insert the cuttings made from well-ripened one-year growths, singly, in small pots filled with sharp clean sand. These are plunged in a propagating-case where a good bottom-heat can be maintained, and kept liberally sprinkled with water heated to the same temperature as that of the case. We make the cuttings from single joints, with leaf attached, cutting from one to two inches below and one inch above the leaf. The longest of the leaves are sometimes shortened to save space, but otherwise this is not necessary. After striking, the first shift is made into three-inch pots; the principal material used is fibrous peat, with a surface covering of sphagnum-moss, and the whole should be firmly packed in the pots or baskets. We prefer to plant in baskets after the plants have attained sufficient size. The moss on the surface helps to retain the moisture, for lack of which they should never be allowed to suffer. If plenty of water is not given, the pitchers will become shriveled at an early stage of their formation, and the leaves will lose their bright green color and assume a reddish tint. During the summer months syringing will be required three or four times a day. In winter less syringing will answer, but hard firing will necessitate the frequent application of water to the pathways and brick-work of the house to guard against a drying atmosphere. This syringing and damping also serves to keep down red spider, the most dreaded insect enemy. We try to maintain a night temperature of about sixty-five degrees during the winter months, allowing a rise of about ten degrees by day. For the summer months, of course, it is impossible to lay down a hard and fast rule. As *Nepenthes* grow rapidly we find it desirable to shorten back or cut them down every season. They break very readily. If allowed to run they incline to produce flowers

rather than pitchers. A few may be allowed to flower and ripen their seeds if it is intended to raise young plants by this means. Hand pollination is necessary, as the male and female flowers are produced on different spikes, and in some cases on different plants. The variety *N. Veitchii*, for example, usually produces female, while *N. lanata* generally throws

post of chopped sphagnum and peat, with a little sand. A good percentage of the seed will germinate, providing it has been well ripened, but in a minimum temperature of sixty-five degrees it will take from two to three months. When large enough the plants should be set singly into smallest size pots, using the same compost as for sowing the seed. The pots



Fig. 1.—Patton's Spruce, *Tsuga Pattoniana*, on Mount Ranier.—See page 1.

male flowers, though this should not be taken as a hard and fast rule. The seed takes several months to ripen, so that the work is somewhat slow, though none the less interesting. When nearing the ripening stage a close watch should be kept or the pods may burst and the seeds drop out. The seeds should be sown in pans as soon as gathered, in a com-

should be plunged in moss. It is a good plan to plunge them in pans or boxes, as they can then be readily shifted about, and it is thus easy to place them in a lighter situation. Additional shiftings must be attended to when required. The raising of these seedlings requires considerable patience, as it takes about three years of careful watching before the result

of the labor is shown, and another year before it is certainly determined. A great majority of the seedlings usually turn out well, however, and, strange to say, scarcely any two are alike, a fact which accounts largely for the numerous varieties found in cultivation.

Tarrytown, N. Y.

William Scott.

for outdoor decoration is the variegated *Arundo donax*, and this is a good time to prepare for its increase. One of the most satisfactory ways of working up a stock is by treating the canes of last season's growth just as *Dracæna* canes are handled—that is, by laying them down in a propagating bed and just covering them with sand or a mixture of sand and



Fig. 2.—Patton's Spruce on Mount Ranier.—See page 1.

Hints on Propagation.

MANY plants are quite readily propagated during the winter, more easily, in fact, than in spring, when the sun is stronger, and the vitality of cuttings is quickly exhausted unless they are carefully watched. Among the useful plants

sphagnum, or sand and cocoa fibre. If kept thoroughly moist, these canes will break from nearly every joint, and the young shoots will emit roots and may then be cut from the parent cane and potted up. The same result is sometimes secured when these canes are placed in a tank of water in a warm house, and I have seen an excellent crop of young plants

raised from canes that were laid in a shallow pond outdoors in the summer.

Pandanus Veitchii roots now, and a point worth remembering about *Pandanus* cuttings in general is, that they root more quickly when kept a little on the side of dryness and only have water enough to prevent shriveling. This rule also applies to cuttings of variegated Pineapple and to various other Bromeliads.

The reference to *Dracæna* canes suggests the hint that nice top cuttings of these plants can usually be rooted without loss of foliage by nicking the stem with a sharp knife and then mossing up the wound, imitating the treatment often given to *Ficus elastica*. Strong, brightly colored *Croton* tops may be managed to advantage in the same way. To have finely colored *Crotons* it is wiser to select the cuttings to some extent, for while some varieties seem to color up well without special selection, yet there are others that cannot be relied on unless the cuttings are well-marked growths. With both *Dracænas* and *Crotons* the best results are obtained from strong young plants that have not been stunted in any way, but grown on rapidly by good feeding.

Fatsia papyrifera and *F. Japonica*, both of which are useful in the conservatory and in the outdoor garden, may be increased by means of short sections of the stronger roots, buried to a depth of half an inch in sand or light soil in a moderately warm greenhouse. These plants also come freely from seeds, but where the stock is small the roots are more readily obtainable. Root-cuttings, too, offer a practical way to propagate some of the *Clerodendrons* and *Bignonias*, for by this means a stock may be obtained with less trouble than by top cuttings. Cuttings of *Roses*, and of *Tea Roses* particularly, are just now in order, and the wisdom of a proper selection of good healthy growth for this purpose will be apparent to every one who makes the experiment.

If suitable roots of *Clematis flammula* or *C. Vitalba* are at hand they may now be used for stocks on which to graft some of the finer varieties, and a little work of this character will furnish a pleasant variety in the routine of the season. The roots used for this purpose should be stout, clean and free from bruises, and the scions made from firm clean wood. Cleft-grafting is the most convenient method. After grafting, the plants should be buried in sand in slight bottom-heat until the union has taken place, after which they may be potted up into small pots.

Holmesburg, Pa.

W. H. Tiplin.

Climbing Plants for Indoor Decoration.

ONE of the very best of this class of plants to train about a window is *Maurandia Barclayana*, a native of Mexico, with showy blue or purple flowers shaped like those of an *Antirrhinum*, although the tube of the corolla is not enlarged at the base and the so-called palate is not so prominent. These plants are easily grown from seed and can be lifted from the open ground early in autumn, or they can be planted in good-sized pots and sunk out-of-doors during the summer. They are easily supported on cords, about which they twist their petioles, and they have delicate hastate leaves which are most attractive. They bloom abundantly all winter long.

Another good plant is *Cobæa scandens*, which has pinnate leaves with tendrils and large greenish-purple flowers, which are bell-shaped and very abundant. It can also be grown from seed and treated like an annual. It grows very rapidly and can be carried away from the light along the ceiling of a room, and in this position, out of the direct sunshine, the flowers are bleached white and very interesting. *Solanum jasminoides* is another admirable plant for this purpose, producing clusters of pure white flowers, which in the variety known as *grandiflorum* are an inch across. This plant will grow out-of-doors in the summer-time perfectly well, and there is no better one for the decoration of verandas at that season, or of windows in the winter, as it seems to endure the dry heat of a house much better than most others. It belongs to the same family as the *Potato*, as any one can see by a single glance at its flowers. It was introduced from South America more than fifty years ago, and recently it has become quite common. *Manettia bicolor* is another good plant of this sort, with lance-shaped leaves and flowers with tubes of bright scarlet and yellow segments. A good annual plant is *Thunbergia alata*, which can be propagated from seeds like the *Maurandia*. It has white or buff-colored, salver-shaped flowers, often with a dark throat. The *Butterfly Vine*, *Stigmaphyllon*, with heart-shaped leaves and bright yellow flowers, is rather harder to manage than the others, but it is a beautiful plant for sunny places, and it flowers abundantly in small pots. It is a graceful plant with

slender stems. The Ivy-leaved *Geranium* has a rich glossy foliage and clustered flowers of a great many colors. It is as easy to grow as the common *Geranium*, and can be trained on cords, but it is better to droop around the edges of the vase or from a hanging basket.

Orange, N. J.

J. A. Don.

Correspondence.

Dendrolene.

To the Editor of GARDEN AND FOREST:

Sir,—The communication from Mr. Troop, in the number of GARDEN AND FOREST for December 2d, requires a statement from me.

In Bulletin III of the New Jersey Experiment Station, I gave the results of a season's test of "Raupenleim" and "Dendrolene." Raupenleim, an old German preparation, is too expensive in the United States to be of practical value to our farmers, and the effort was made to obtain a native substance that would answer the same purposes at less cost. Professor F. L. Nason, to whom I suggested the matter, thought he could get a material that would answer as well and would be essentially the same as the European product.

Professor Nason was not then and never has been connected with the New Jersey Experiment Stations, and the Dendrolene was not in any sense the result of any investigations made by the Station, nor are we responsible for the statements of any advertisement. The results of my experiments, as given in GARDEN AND FOREST, were exceedingly satisfactory, and those results were accurately stated. Up to the time of publication of my annual report for 1895 no injurious effects were observed on any of the trees under observation in New Jersey. It is to be noted, however, that in my record of experiments only two young trees were treated. On page 10 of Bulletin III, the condition of these trees on September 3d is noted, and it is stated that the European material was the one employed on them. The effect of the material on very young trees, therefore, was not a matter of direct or special experiment. It is certain that none of the older bearing trees in the Durand orchard were in any way injured by the material applied. Early in the present year (March or April), the Messrs. Durand informed me that the two young trees which were coated the entire season of 1895 were still healthy.

On the White orchard of Peach-trees, where the material was applied to keep out the Peach borer, and where hundreds of trees were treated, so sign of any injury was to be seen at the time my bulletin went to press. In the spring of 1896 it was found that there had been considerable penetration through the thin bark of the youngest trees and an apparent check in growth. The injury did not extend to the inner bark, but was taken as a caution and no new coating was applied. It was found, on examination, that the Dendrolene had gradually penetrated the bark tissue of the younger trees, killing the cells as far as it went, and, of course, interfering with the proper circulation of the sap. In the most extreme cases there was a perceptible constriction of the trunk, as if made by a tight band; but this was only found on a few of the youngest trees, not yet in bearing. On the larger Peach-trees no harm resulted, and apparently the material did not get through the dry and hard outer tissue. The Bowker Company was notified of these facts before the beginning of May, and was requested to caution purchasers of their material on these points—especially those intending to use it on Peach-trees, and to discourage a continuous application in any case. It was intended during the season of 1896 to make a thorough test of Dendrolene, mixed with a variety of substances that would reduce its penetrating power, but the experiments were not carried out, on account of my absence.

Dendrolene, so far as I know, contains no caustic and no acid. It is absolutely neutral to all ordinary tests, and the injuries, so far as any have been caused by it, are due to the fact that it very gradually penetrates into thin, active, growing tissue, especially where it gains nutriment of any kind from without. In no case was fully matured outer bark penetrated by the material; only the very young, growing tissue. Furthermore, so far as my observation extended, the penetration is extremely slow, not being noticeable on the young Peach-trees until almost a year from the date of the application. I am yet confident that the material is a good one and that it will serve a useful purpose, though more widely different than I had supposed from the Raupenleim. It will require, however, much more experiment before its true place is ascertained, and its range of usefulness will probably be much more restricted than I hoped at first, and believed. At all events, it will be

well to exercise care in applying the material on young trees, and I would not now advise any application to remain permanently.

Rutgers College.

J. B. Smith.

Recent Publications.

The Timber Pines of the Southern United States. By Charles Mohr, Ph. D. Together with a Discussion of the Structure of their Wood. By Filibert Roth. Washington: Government Printing Office.

These monographs have been prepared under the direction of Mr. B. E. Fernow, Chief of the Division of Forestry of the United States Department of Agriculture, for the purpose of giving a true conception of the "extent, condition and value of the pineries of the south and of the nature, development and characteristics (botanical, silvicultural and technological) of the Pines in that region, with the hope of inducing natural forestry methods in their use and reproduction." This purpose has been well carried out, and the bulletin will take rank among the most instructive publications of the department.

Dr. Mohr's part of the work consists of about a hundred quarto pages, and since he has been a frequent contributor to these columns our readers need not be told how thoroughly he has studied these interesting forests, and how clearly and how carefully he has treated the subject from both scientific and economical points of view. Of course, the greatest part of his work is devoted to the Long-leaved Pine, *Pinus palustris*, the great timber-tree of the south, which is found in the maritime belt about 125 miles wide, sweeping along the coasts of the Atlantic and Gulf from the southern boundary of Virginia to the uplands which border on the Mississippi River bottom. The wood of this Pine is unsurpassed by that of any other conifer for purposes of construction, and equal to that of almost any timber-tree in economical importance, so that it has always been in great demand for naval architecture, for civil engineering and for all purposes of heavy construction. Both for home use and for export it has been recklessly cut, while the manufacture of naval stores from its resin is one of the most largely developed industries of the southern states, as well as one of the most wasteful industries now prosecuted by civilized man. Investigations by the Division of Forestry have shown that the boxing of a tree does not injure the strength or durability of its heart-wood, but if the tree is left standing, the wound, of course, interferes with healthy growth, while beetles bore their way into its trunk, and spores of fungi find entrance to cause decay. Worse still, the exuded resin so increases the inflammability of the woods that a fire once started soon sweeps over a large area, not only destroying the standing timber, but excluding all hope of new growth. The first plate in this volume, which shows a stretch of this Pine land after the merchantable timber has been removed, presents a scene familiar to every traveler in the coast region. The trees are spindling, scattered, blackened with fire, and this desolated forest makes one of the most depressing landscapes that can be imagined. Throughout the area of nearly a hundred thousand square miles over which the Long-leaved Pine extends, a stupendous amount of timber-wealth still remains, in spite of the immense amount of land that has been cleared for agricultural purposes, and the large sections from which the good timber has been culled out or the original growth entirely destroyed. But when we remember that the present annual cut will increase as the northern Pine gives out, it is clear that the logger is far outstripping the possibilities of these woods for reproduction, and if the naval store industry is continued in the same profligate way, and the devastation by fire and domestic animals is not arrested, their extermination for all practical purposes is certain. During the earliest part of its development the Long-leaved Pine grows slowly, so that the young trees are easily suppressed by competing species even under the best conditions. Again, it is impatient of shade and needs direct sunlight both for germina-

tion and for growth. Besides this there are only occasional seasons when it seeds abundantly, and if the seed falls in a wet, undrained soil its sprouting power is lost. Left to the ordinary course of nature, then, the Long-leaved Pine would have a small chance of successful reproduction, but when to its ordinary enemies the influence of man is added, we can easily see why its offspring rarely takes the place of the parent tree, even in regions most favorable to its natural renewal. The economic conditions of the present are hardly such as to justify an attempt at artificial reforestation, but the importance of this valuable timber to the industrial and commercial prosperity of the people of the country which it inhabits ought at least to suggest to the owners that its natural reproduction should be encouraged.

The Cuban Pine, *Pinus heterophylla*, has a greater capacity for natural reproduction than the Long-leaved Pine, and it is easier to renew in forest artificially. It grows with greater rapidity; it furnishes timber of large dimensions as good as that of *P. palustris*, and it yields resin in abundance. On this account, Dr. Mohr concludes that for reforesting the low Pine lands of the southern-coast region, where it is already making an aggressive growth, it is to be preferred not only to any tree within its original habitat, but that it will be useful far beyond the range of its natural distribution. Very interesting, too, is Dr. Mohr's account of the Short-leaved Pine, *Pinus echinata*, which stands next to *P. palustris* in the importance of its timber. The wood takes as good a finish, and is more easily worked, being softer and containing less resinous matter than the timber of the Short-leaved Pine, and it is therefore often preferred by the cabinet-maker and house carpenter. Fortunately, too, the tree produces abundant crops of seed almost every year, and it makes a successful struggle with competing trees in the shade or sun, so that it soon takes possession of the soil with a little assistance from the hands of the forester. It is also of great advantage to the farmer because it furnishes him with an easy method of restoring a tree covering to denuded uplands.

The Loblolly Pine, *Pinus taeda*, is a tree of more economical importance than was once supposed. It is as aggressive a grower on the coast plain as the Short-leaved Pine is on the rolling uplands of the interior. The rapidity with which it colonizes clearings and old fields has given it the common name of Old Field Pine, and the tenacity with which it retains the ground which it has once possessed for its own seedlings, points to its value in forest management. It also produces abundant seeds, it grows rapidly, and although the timber is in some respects inferior to that of the Long-leaved and Cuban Pines, it will probably play quite as important a part in the forestry of the future as will the Short-leaved Pine.

The Spruce Pine, *Pinus glabra*, is the only really soft Pine of the southern states. It is the least common of the Pines of this region, never forms extensive forests, and for the most part is scattered among broad-leaved trees, both deciduous and evergreen. It has, however, the great advantage of thriving under shade, and for which purpose it will, no doubt, be largely used by the trained foresters of this region in generations to come.

The wood of all these trees is similar, not only in appearance, but in minute structure, and the characteristics and anatomy of each, as concisely recorded by Dr. Roth, who has charge of the timber physics of the department, make an extremely interesting paper. The discussion of such points as the differences between sap and heart-wood, and between spring and summer wood, and the like, are illustrated by plates of cross-sections, magnified views of resin ducts and other histological details, so that even the general reader can find much to claim his attention. Mr. Fernow contributes an introduction to the whole, in which he sums up the work of Dr. Mohr and Mr. Roth. He offers diagrams to show the comparative growth of average specimens of the different species during a given time, in height, in diameter and in volume, and, altogether, he makes a clear summary of

the work for the general reader. Judging from the best data at hand, Mr. Fernow concludes that the pine timber standing and ready for manufacture may reach two hundred thousand million feet, while the lowest annual consumption of the future will probably be seven thousand million feet. He does not, therefore, prophesy that the pine supply of the south will be exhausted in forty or fifty years, for if we should begin rational forestry now, the forests may be kept as a source of natural supplies even though these supplies are reduced. But, after a review of the recuperative powers of the various species, he says: "Considering that the timber on which we now rely and on which we base our standards came from trees usually from 150 to 200 years or more old, and that none of these Pines make respectable timber in less than from sixty to 125 years, the necessity of timely attention to their renewal is certainly apparent." To this moderate statement every thoughtful person will give unqualified assent.

Notes.

The bushy tops of branches of young Long-leaf Pine-trees were among the handsomest offerings for decorations during the holiday season. Gray Spanish moss and large Palmetto-leaves, also from Florida, were more freely used than ever before, and the supply of English and southern mistletoe was all sold before Christmas Day.

Mr. I. H. Cammack, in a recent address before the Southern California Fruit-growers' Institute, says that the Anona Cherimolia, the tree which produces the chermoyer, is now growing in several places in California, and it probably will thrive in any climate not too severe for the Lime. The fruit matures in the winter and spring, and it can be gathered while firm and shipped for several days' journey successfully. The color of the fruit is brownish yellow with a reddish cheek. It is somewhat heart-shaped, contains few seeds, and it is very rich and is considered by many as a most delicious fruit, although it is not relished by all persons when they first taste it. The trees come nearly true from seed and begin to bear about the fourth year.

The Roselle, *Hibiscus Sabdariffa*, is a native of tropical Asia, resembling the Okra in growth, possessing great resistance to drought and yielding an acceptable food-product. It has been tried in agricultural stations of southern California, where it is said to be ornamental, with dark red stems and pods showing through rather scanty green foliage. The juice from the fleshy calyces makes a cooling acidulous drink and is useful for jelly. The mucilaginous properties of the juice render the setting of the jelly certain, and its dark cherry color and sprightly acid make it very desirable. As it will grow in hot, arid situations, Mr. Wickson, of the Experiment Station at Berkeley, is distributing seed to those parts of the state where it will thrive.

Winterberries may now be seen in the wholesale markets by the crate, and cost fifteen cents a quart. Large bright red Tangerines, from Florida, cost sixty-five cents a dozen, and the smaller and paler Mandarins, from Italy, sell for the same price. Grape-fruit, which is becoming scarce, costs twenty-five cents for large fruits of even color, from Florida. Coe's late red plums are still seen in some of the high-grade fruit-stores, and luscious, fully ripened persimmons, from Florida, the latter costing \$1.50 a dozen. Small round baskets holding fifteen beautifully grown strawberries, picked with long stems, sell for \$2.25 to \$3.00. Hot-house melons, Spanish melons and prickly pears may be had at fancy prices. The last of the Comice pears were sold during the holiday season, and the russet Winter Nelis, the deep green Easter Beurre, the bright Forelle and spicy Seckel pears are now among the best. Small Strawberry pineapples, from Florida, cost fifteen cents each, and large Abaco pineapples, grown under shelter, from Orlando, in the same state, cost \$1.00. Mushrooms, cucumbers, tomatoes as even and showy as any choice fruit, and asparagus, are offered in the best fruit-stores. The latter vegetable is tied in bunches containing a dozen stalks a foot in length, and costs \$1.00 for this quantity.

The possibility of growing Cauliflower under glass with profit was last year tried in the Missouri Botanical Garden, and at the meeting of the Society for the Promotion of Agricultural Science, held in Buffalo last summer, Mr. H. C. Irish gave an interesting account of the methods of cultivating the

crop. An interesting part of the experiment was the successful growing of Lettuce between the rows of Cauliflower. Lettuce will not mature good crops among the Cauliflower-plants unless they are set eighteen inches apart, but since a given area will produce nearly as much Cauliflower in weight when the plants are set at this distance as it will when the plants are set more closely, it is possible to get crops of both vegetables, and the lettuce will be clear profit beyond the income of the Cauliflower. Later on, Cucumber-vines were set around the sides of some of the benches between the Cauliflower, with a view to training them up the roof, and others to run over the benches when the Cauliflower were removed. A row of Chervil was also planted around the sides of the benches, from which many leaves were cut for garnishing, and it proved to be a good plant for that purpose. Mr. Irish estimates that since one man could attend to a house 170 feet long by twenty-four feet wide, with two walks and 100 square feet of bench-room, that the cauliflower, lettuce and cucumbers would bring in the winter a total income which might amount to \$1,150, which, after deducting expenses, would be something over \$860 for interest on the investment and the labor of one man.

Bulbous plants are now represented in the florists' windows by flowers of Freesia, Daffodils, Chinese Narcissus, Roman Hyacinth, Lily-of-the-valley, Liliun Harrisii and *L. longiflorum*. The yellow and white French daisies, white lilac, forget-me-nots, sweet peas, camellia, daphne odorata and showy bracts of poinsettia are noticeable. In collections of standard varieties of roses Ulrich Brunner and Magna Charta are occasionally seen, and the comparatively new President Carnot. Many lots of Orchids and other costly flowers were frozen in transit to the wholesale dealers during Christmas week, and the prices and sales of cut flowers were greatly affected by the cold weather. Much of the stock had been held back for the holiday trade, and the proportion of low-grade flowers was thus unusually large. As the dealers handle only the best stock and the Greek street venders could not carry on their trade, sales were limited to the best grades, and immense quantities of poorer flowers remained unsold and went to waste in the wholesale establishments. Red carnations were in marked favor, and Meteor, Portia and Garfield sold readily at fair prices, as did good yellow carnations, while there was almost no demand for white ones, and pink varieties sold slowly, except those of the highest quality. On Christmas and the day preceding about 1,700 bunches of violets, each containing a hundred blooms, were bought by retail dealers. American Beauty roses were most in demand in their class, and selected flowers sold at retail for \$2.50 apiece. The Christmas trade in cut flowers was, altogether, satisfactory to the retail dealers. Growing plants in fancy baskets were more popular than ever before. New Year's day failed to stimulate the flower trade, and the day was scarcely more busy than an ordinary Saturday during the winter season.

According to the London *Times*, the forests of western Australia are exceedingly rich in trees of economic importance, among which the Jarrah, or *Eucalyptus marginata*, is now the most important. In constructive work, where wood is brought into contact with soil and water, this timber is superior to that of any other wood in that forest. A healthy tree of average size is from ninety to a hundred feet high and from two and a half to three and a half feet in diameter at the base, and it will grow so as to produce logs two feet through at the base in about fifty years. It grows in sections where the rainfall ranges from thirty-five to forty inches in the year, and the wood when dried weighs sixty pounds a cubic foot. It is red in color, takes a good polish, is easily worked, and is good for piles, bridges, boats, furniture, railway-sleepers and charcoal. It is usually found mixed with or near the Karri, or *Eucalyptus diversicolor*, a giant species, straight and regular in growth, umbrageous in appearance, good specimens being two hundred feet high, four feet in diameter breast-high, and with a stretch of 120 to 150 feet from the ground to the first branch. It is a rapid grower and will produce marketable timber from thirty to forty years. This wood is red in color, very much resembling that of the Jarrah. Its texture is hard and heavy, and it is tough and not easily dressed. For bridge planking, flooring and beams it is unequaled by any wood in the colony. Karri timber is largely exported to London for paving the streets since its surface is not easily rendered slippery. There are other valuable trees in this forest, the timber in which is estimated to be worth more than six hundred million dollars. Two thousand men are now employed in cutting timber, and the output last year represented a gross value of two million dollars, and this will be increased by the end of the century to at least ten million dollars.

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Park-making as a National Art.

THE *Atlantic Monthly* for January contains a noteworthy article under this title by Mrs. M. C. Robbins, who is well known to the readers of this journal. Her thesis is that the desire for the creation of beauty in America will find its fullest expression in the design and construction of public parks rather than in painting, sculpture or architecture. We have already done well in these latter fields, but our craving for liberty, and for enlarged and untrammelled utterance, can only be satisfied by bringing under control the mighty forces of nature and compelling them to develop and make manifest our artistic ideas. It is a significant fact that America has already produced one preëminent artist in this field, and that the park systems of several American cities are unrivaled for grandeur of conception.

The article presents a specific phase of a more general subject discussed by Mrs. Robbins in the December number of the same magazine under the title of "The Art of Public Improvement," a phrase meant to include in a large and rather vague way every effort of individuals and communities to preserve and transmit to posterity what is most beautiful and interesting in nature. This tendency is manifested in the reservation of tracts of forest land, the increasing number of parks and playgrounds, the improved care of towns and villages, the rescue of beautiful landscapes from defacement and the preservation of objects of historical interest. This inclination is in accordance with the genius of the English race, and especially with the fresh young branch of it which has found itself with a continent to work upon. In our youthful exuberance we long for something that will appeal to all the people—something colossal and distinctly American—and this so-called Art of Public Improvement will find full scope in treating vast areas of mountain and cataract and forest in works of sufficient moment to need the support of sovereign states, or even of the Federal Government, and which need an army to protect them. This art must be democratic to suit the American character, large and simple, so that it may be intelligible, not only to a cultivated class, but to the average mind. We have room enough to give free hand to our desires, for with little cost we can secure public reservations of enormous extent, yet of remarkable

natural beauty, for we still possess square leagues of primeval forest which are incomparably more impressive than the planted trees of European woodlands. That a sentiment like this is growing and seeking to find expression in every direction is seen in the establishment of the great forest reservations in the west; in the rescue of such places as Niagara, Yosemite and Yellowstone for public use; in the preservation of the battle-fields of the civil war as "mementoes of the most tragic period in our country"; in the foundation of societies for preserving in more than one state beautiful and historical places; in the purchase of spacious game preserves by clubs; in the establishment of the Arnold Arboretum and many botanic gardens; in the greater simplicity shown in the ornamentation of rural cemeteries; in Arbor Day; in village improvement societies; in improved roads and school-grounds. Mrs. Robbins' conclusion is that "there is everything in the United States to nourish a great art—wealth, enthusiasm, generosity, a sense of boundless capacity, the verve and spring of youth and unlimited aspiration. In the Art of Public Improvement, the dreamer and the utilitarian can combine, the nation's beauty and the nation's wealth can in it be united, and our achievements may be such as to satisfy even American ambition."

In the article devoted more specifically to park-making, it is pointed out that the ancient pleasure-grounds of the Old World originally belonged to sovereigns and were paid for by taxes wrung from the people who could not enjoy them. In this country, however, all parks of any extent have been designed for the people, and although they have been created within a single generation they are a constant source of delight to all, and they rank in extent and beauty with any resorts of the kind in the world. The rapidity with which the acquisition of park lands by cities has been going on will be understood when it is remembered that in 1869 there were only two well-advanced rural parks in the United States. Fifteen years later there were twenty, and now there is hardly a city of consequence in the country which has not made the beginning of a system of parks and parkways. It is true, as Mrs. Robbins says, that when the schemes now begun have been fully carried out we shall have public reservations reaching, in what is practically an unbroken series, from the eastern seaboard to the shores of California. "The idea of such a continuous reservation, a national parkway from the Atlantic to the Pacific, leading from one beautiful pleasure-ground to another, or passing through great tracts of woodland controlled by Government foresters, is not inconsistent with the genius of our country, which ever seeks a closer union between its parts; while the gradually enlarging park systems of our cities indicate the way it may be brought out in the linking together of suburb to suburb by great boulevards, which tend to bring civilization to distant homes by affording safe and easy communication between them."

Our people have not always been wise in selecting their grounds, but they have usually developed them in an artistic way and have held the necessary constructions in true subordination to the natural character of the scenery, and in this way they have been an educating influence in the growth of popular taste. An attractive park stimulates the desire for appropriate home surroundings, and a visitor to these well-kept pleasure-grounds carries away lessons which are put to practical use at home. In this way the park becomes the common school where the first lessons are taken in the distinctive art of the nation. Hundreds of thousands of people, for example, who saw at the Columbian Exposition how quickly miles of newly made shore could be fringed with beautiful vegetation went away with memories of that fairy-like scene which will never be effaced, and with new ideas of what can be accomplished by refined and restrained art in waterside planting. Every example of the kind tends to chasten and purify taste, and to furnish ideals which will be realized in years to come in private and public grounds all over the country.

It must not be supposed that there was no opposition to this movement in favor of public parks when it first began. Indeed, the vigor of the movement can only be estimated by the opposition it created at the outset. When, after long argument, the land for Central Park was acquired, good people feared that it would simply be a field for the development of riot and license among its frequenters, and even after the enterprise was well advanced a leading newspaper in this city pronounced it "all folly to expect our country to have parks like old aristocratic countries." It was argued that reputable gentlemen and ladies would never consent to associate themselves with rowdies and nursemaids, and eminent citizens declared that no gentleman would ever resort to it or allow his wife and daughter to visit it. Lawyers affirmed that it would be impossible to police so large a space, and one wealthy gentleman protested against the extravagance of its construction, and asserted that the designs were quite fine enough for his own private grounds. Fortunately, the Park Commissioners were men of nerve and intelligence, and they were clothed with extraordinary powers, so that they rushed the work, employing thousands of laborers at once to get it beyond the reach of those who were bent on stopping it. It need not be added that it required only a few years' experience to demonstrate that the influence of the park was refining instead of degrading, and that the fourteen million dollars which it originally cost was one of the most fruitful investments the city ever made.

We no longer hear objections of this sort against park-building, but there is another danger that ought to be shunned. It is not enough to secure a certain number of acres wherever they can be had with least cost and trouble. In the first place, the land should be wisely selected and its boundaries intelligently determined. Design for its improvement must be made by competent artists and executed with skill. When completed, pleasure-grounds must be maintained with care, for, if left to uncontrolled nature and unpoliced, they may become repulsive desolations. To secure a good design we need a school of landscape art, for, although such a school will never create a great artist, it can teach him the history of what has been done, point out to him what tools he needs and how to use them, and show him how he can most directly reach his end. Graduates of such a school, with added instruction in horticulture and engineering, ought not to commit any gross offenses against good taste in Landscape Art.

Mrs. Robbins' article includes an interesting sketch of the park enterprises in many of our great cities, and although all readers will not be convinced by its optimistic tone that the millennium of pure art is at hand in America, it will be found instructive and stimulating.

Classification of Varieties of Peaches.

THAT there are well-defined types of Peaches which behave differently in different latitudes is well known, and some knowledge of the classification of varieties as affected by climate is necessary, not only to the practical grower, but to the scientist as well. The Peach has been so modified by climatic influence and crossing of the different types that it is difficult to devise a system which will include all varieties and not be subject to some criticism. But if a system can be devised by which one can distinguish a large number of varieties and predict within a reasonable degree of certainty which types are likely to succeed in a given section, a long step is made in the direction of most valuable knowledge. The one based upon the presence or absence of glands on the foliage is of considerable value in distinguishing varieties in the nursery before they fruit. But we have varieties which bear different glands upon the same tree. Seedlings from a given variety may bear entirely different ones, and vary also in the adherence or non-adherence of flesh to the pit. And this is true even when the variety has been fertilized by its own pollen.

There are types coming from China, Japan and Java, and others which are now being built up in the southern part of the United States, which the above points do not distinguish with clearness. We have seedlings from the Honey Peach which

came from China in 1854; seedlings from the Peen-to, which came from Australia in 1862; then, again, there are seedlings of the Spanish or Indian type; all of which are adapted to more southern latitudes than those of the Persian strain, which constitute the bulk of northern orchards. These new types are proving valuable along the Gulf states, where the Peach has not been grown as successfully as it has farther north. It is important now that the botanical characteristics of each type (which we shall call race for a better term) should be recorded with clearness, and the climate in which each grows best be pointed out.

During the past four years the Peach has been one of my special studies. Our experimental orchard contains 190 varieties. Large experimental orchards have been studied near the Gulf and over a thousand miles farther north. From what I have thus learned it seems to me that what is known as the "Onderdonk classification" is the best. An outline of this scheme appears in the report of the United States Department of Agriculture for 1887, page 648. Some of the distinctions made in this classification cannot be noticed with decisive clearness a few hundred miles farther north, but in the semi-tropical climate of the coast region the characters are striking. This at once indicates that the different races originated in different degrees of latitude and at different altitudes. These facts are further substantiated by botanical characteristics. We divide the Peaches now cultivated in the United States into five races: (1) Peen-to, (2) South China, (3) Spanish or Indian, (4) North China, and (5) Persian. By race is meant "a variety so fixed as to reproduce itself with considerable certainty by seed."

SEED CHARACTERISTICS.—The shape, size and corrugations of the seed are so well marked in the more distinct representatives of the different races that after a little practice one can distinguish them apart by this means alone. This can be readily seen from the figure (see page 13) from a photograph.

It will be seen that the seed of the Peen-to is nearly round, much compressed at the ends, corrugations small and somewhat rounded. The seed of the Honey is oval, with apex slightly recurved, corrugations slight, prominent flange on one side. Seed of Spanish is large, oval, nearly flat, apex prominent, corrugations very long and wide, at the base they run more longitudinally than in any other race, flange on one side often prominent. Seed of North China is nearly round, very thick, corrugations rather slight and irregular, apex rather prominent. Seed of the Persian is somewhat round, more flattened at the base than any other, corrugations prominent toward apex, but very seldom extend to base, apex more or less prominent. A resemblance can be seen between the Spanish and Persian, and as there is no definite history in regard to the origin of the Spanish it is probable the types had the same origin. The Indian type of the Spanish can only be distinguished from the Persian in many cases by the heavy down on the fruit, which is characteristic of the Spanish.

THE DIFFERENT RACES AS AFFECTED BY CLIMATE.

I. PEEN-TO (*Prunus platycarpa*. Decne.) Tree rather large; branches vigorous, willow-like, branching at an angle of about forty degrees; flowers large, opening early, frequently in January in the Gulf states, often at a low temperature and very irregularly; leaves narrow and long, inclined to be evergreen; fruit much flattened; skin white and mottled with carmine; flesh white; flavor sweet, with peculiar almond tang. It is adapted to the northern part of the Citrus belt, in which climate it ripens from May 1st to June 1st. It has a tendency to sport, and some valuable varieties are now coming from it for the extreme southern part of the Gulf states where other races will not grow successfully.

II. SOUTH CHINA RACE.—(The parent of this race is the Honey Peach, *Prunus Persica*. B. & H.) Tree medium-sized; branches leaving the trunk at an angle of about fifty degrees and curving upward; buds quite prominent; flowers always large and very abundant, with greater resisting power against cold than any other race tested in this climate; has borne crops annually during the past four years, when many other varieties belonging to different races failed; foliage small, slightly conduplicate, distributed all along the limb, color dark green, in fall slightly tinged with red; requires short season of rest; fruit rather small, somewhat oval in shape, slightly flattened, suture very deep at basin, but does not extend more than one-third the way down; apex long and recurved; flavor peculiar, honey sweet. Supposed to have originated in southern China, from which the seed came. This race is adapted to more southern climates than any other, except the Peen-to. Honey seedlings are proving very valuable for the southern Gulf states.

III. SPANISH RACE.—Tree very large, except in Indian type,

which evidently has considerable Persian blood, judging from the color of the young wood, which is reddish, the naked places on the bearing wood and the corrugations on the pit and its general shape; limbs large, long and spreading; branches low and drooping; flowers nearly always large; leaves small and flat, persisting late in fall and turning slightly yellow; fruit very decided in character, ripening very late, nearly always yellowish when mature, and covered with heavy down; in the Indian type the fruit is striped with red; a heavy bearer and sure cropper in its proper isotherm. Seems to have come from the Indian type brought over from Spain by the Spanish missionaries and distributed among the Indians of the extreme southern states. Perhaps it is owing to successive seedlings in more favorable climate that the type is now varying. All over the southern states one hears the expression that seedlings are surer bearers than budded trees, and there seems to be some truth in this belief, because by growing seedlings continuously varieties may adapt themselves to climate. This type is adapted to isothermal lines north of where the South China race flourishes.

IV. NORTH CHINA RACE.—The original Chinese Cling, which is a dwarf tree near the coast, is the parent of this race. It is not at all adapted to regions along the Gulf. Two or three hundred miles farther north it and its seedlings do well. It is the parent of the largest peaches in the United States; blooms later than the Persian, and the flowers are nearly always large; foliage large and flat, turning toward autumn in the southern states to a peculiar pea-green, and this type among others in an orchard can be detected with ease by this means alone. The color of the foliage foreshows the color of fruit, as none of the seedlings, as a rule, are highly colored. The parent came from China, and it is adapted to zones farther north than those suited to the Spanish.



Fig. 3.—Peach Pits.—See page 12.

1. Peen-to. 2. South Chinese (Honey). 3. Spanish or Indian (six varieties).
4. North China (Chinese Cling variety). 5. Persian (Old Mixon Free variety).

V. PERSIAN RACE.—Tree medium size to large; limbs short and thick, with long naked places; bark usually rich purplish red on young wood; flowers large or small in different varieties; foliage crimped and conduplicate, with purplish tinge before falling, which happens early. This race requires a long period of rest, which indicates that it has had a more northern origin than any other, supposed to have been Persian. The seedlings now form the bulk of northern Peach orchards. Fruit usually the most highly colored and of the finest flavor. In this race we sometimes find a variety with yellow flesh, but the flavor is not as good as the others. It is almost useless to plant this race in the southern part of the Gulf states.

There are some ornamental varieties which will not be mentioned here.

Experiment Station, College Station, Tex.

R. H. Price.

It is a mistake to suppose that the value of charming natural scenery lies wholly in the inducement which the enjoyment of it presents to a change of mental occupation, exercise and air-taking. Besides and above this, it acts in a strictly remedial way to enable men to resist the harmful influences of ordinary town life and recover what they lose from them; in short, to establish sound minds in sound bodies. It is thus a sanative and restoring agent of vital importance to the health and strength and to the earning and taxpaying capacity of a large city, and to the mass of the people it is practically available only through such means as are provided by rural parks.

Frederick Law Olmsted.

Foreign Correspondence.

London Letter.

LECTURES ON HORTICULTURE.—The Royal Horticultural Society continues to provide lectures for its bimonthly meetings at the Drill Hall, and the bulk of them are a success. Next year's programme contains some items of more than usual interest, namely: "Microscopic Gardening," by Professor Marshall Ward, of Cambridge; "Artificial Manures," by Mr. J. J. Willis; "Diseases of Orchids," by Mr. G. Massee, F.L.S., of Kew; "Physiology of Plants," by Professor S. H. Vines, of Cambridge; "Mutual Accommodation between Plant Organs," by Professor G. Henslow; "Roots," by Professor F. W. Oliver, and "Sporting in Chrysanthemums," by Professor Henslow. In addition to these scientific lectures by eminent specialists, there will also be lectures upon practical subjects by leading practitioners. These lectures are all afterward published in the society's journal. The great exhibition at the Temple is announced for May 26th, 27th, 28th, and the exhibition of fruit at the Crystal Palace for September 30th and October 1st and 2d. These exhibitions have become an important annual institution in London.

HORTICULTURAL EXHIBITION HALL.—Since the Royal Horticultural Society left South Kensington, horticulture has been without a suitable exhibition hall in a central position in London. An attempt was made two or three years ago to raise a sufficient sum to build a hall and offices for the society, but from some cause or other this proved abortive.

It is now proposed that, in commemoration of the Queen's long reign, next year a Victoria Palace or Queen's Hall for Horticulture should be built in London. Mr. J. L. Wood, a professional horticulturist, having drawn up an elaborate scheme, the plans of which are published in the gardening papers, and which might, perhaps, provide all that is needed. This scheme is, however, a very costly one, and it is questionable if the money would be forthcoming for it. There is no better plan before the public than the proposed amalgamation of the Royal Horticultural and the Royal Botanic societies. For this little or no money would be required, and the needs of metropolitan horticulture would be fully satisfied.

RAILWAY RATES FOR GARDEN PRODUCTS.—English growers hitherto have had good cause for complaint against the excessive charges made by the railway companies for the conveyance of their products, compared with the charges made by the same companies for the conveyance of foreign products from port to market. The Great Western Railway has set a good example by making considerable reductions in their rates for agricultural, garden and dairy products carried by their passenger and goods trains. They are also willing to collect small quantities, under certain conditions, and to charge for them in the aggregate as if they were one consignment of from ten hundredweight, the minimum, up to three tons, the maximum. Thus small growers in the same neighborhood may, with little trouble, combine for the purpose of marketing their products on favorable terms. Hitherto the cost of sending a few bushels of apples a hundred miles often exceeded what they would fetch in the market. At the present time I have to pay six shillings for a bushel of poor apples, fit only for cooking, and I am told that there are plenty of growers in the country who would be glad to get two-thirds of that price for good home-grown fruit.

PUBLIC GARDENS AND OPEN SPACES.—A joint committee formed by the Commons Preservation Society, the Kyrle Society, the Metropolitan Public Gardens Society and the National Trust for places of historic interest, with a view to commemorating the Queen's long reign, has drawn up a scheme by which it is proposed that every locality should dedicate a plot of ground to the use and enjoyment of the people, and to be called a "Queen Victoria" garden, park,

playground, or whatever name would be appropriate. "We aim," says the committee, "at connecting the memory of the Queen with something which will permanently make a neighborhood more healthy, more agreeable, or more interesting to live in. The exact form which such a memorial would take might vary largely in different places. In the metropolis and other towns there may be square gardens or disused burial-grounds, or other lands, which have been hitherto, by some accident, saved from the builder, but which are doomed either to absorption into the surrounding areas of bricks and mortar, or to waste and neglect; to recover such spots, and place them under the management of the town authority, would be an invaluable memorial of the Sovereign's long and beneficial rule. Finally, there may be some earthwork or ruin of great interest, or even some building of rare architectural beauty or historic associations, which might be purchased and devoted to some public purpose, and which would form a possession of unique value for future generations."

THE FLORA OF BRITISH INDIA.—The first part of this monumental work was published in 1872; the twenty-second and last part was issued a few weeks ago. It is, perhaps, the largest, most complex and the most valuable of all the large Floras prepared at Kew, and it is mainly the work of Sir Joseph Dalton Hooker, who, be it remembered, is now in his eightieth year. As a very large proportion of popular garden plants, particularly Orchids, are included in this Flora, it has a special interest for horticulturists. The descriptions, which are in English, are clear and concise, so that one has little difficulty in identifying plants by their means; the synonymy, references to figures, etc., are exhaustive (one might say of synonyms that they are often exhausting in their number). The whole work is in seven volumes. It is not a work for the ordinary library, but as a book of reference it has great value for the botanical cultivator and writer. Such plants as Rhododendrons, Ferns, Orchids, Palms, Bamboos, Liliaceae, Aroids, Begonias, Ixoras, Hoyas, Primulas, Gentians, Acanthaceae, Ficus, Quercus and Scitamineae (Hedychium, Musa, etc.), are very largely represented in the regions comprised within the area termed British India. That vast and varied stretch of country known as the Himalaya has yielded more good garden plants, perhaps, than any other similar region in the world, not even excepting South Africa, for while the Ericaceae, Proteaceae and many bulbous plants which used to be grown in English gardens are now never seen, except in horticultural picture-books, the Himalayan Rhododendrons, Dendrobiums, Primulas and hosts of other things are growing in popularity. The Orchid grower alone owes a large proportion of the most beautiful and useful of his favorites to British India.

THE SUGAR QUESTION.—The sugar-growing industry in the West Indies is threatened with ruin from the crushing competition of beet-sugar. The British Government has, therefore, appointed a Commission to inquire into the condition and prospects of the islands affected, with a view to helping the planters and others concerned. The Commissioners are Sir Henry W. Norman, Sir Edward Grey and Sir David Barbour, and Dr. Daniel Morris, Assistant Director at Kew, has been appointed to accompany the Commission as expert adviser in agricultural and botanical questions. Dr. Morris's experience in Ceylon, the West Indies and Kew specially qualifies him for work of this kind. Kew initiated a policy for the development of the economic resources of the West Indies more than twenty years ago, and the fact that Jamaica entered with spirit into this movement, no doubt, accounts for the better condition of things in that island compared with others.

Messrs. J. Veitch & Sons.—The famous nursery and seed business known all over the world as "Veitch's" is following the example of many other large commercial houses and will shortly be floated as a limited liability company. Mr. Harry Veitch will act as Director-Chairman, and his nephew, Mr. James H. Veitch, will be managing director.

Mr. R. Warner died on December 17th last in his eighty-third year. He has held a prominent place among the leading amateur Orchid growers for about fifty years. The late Mr. B. S. Williams, the Holloway nurseryman, was once upon a time Mr. Warner's gardener. The *Orchid Album* was the joint production of Messrs. R. Warner and B. S. Williams, and I believe Mr. Warner assisted in the production of *Williams' Orchid Grower's Manual*. His *Select Orchidaceous Plants* is held in high esteem. His garden at Chelmsford was famous for the large, well-grown specimens of Orchids, especially Cattleyas, produced in it. He was also a keen grower of hardy fruits. English horticulture can ill afford to lose such men.

London.

W. Watson.

New or Little-known Plants.

Aster tardiflorus, L.

IN a recent paper* I have discussed the history of this species, showing how, through lack of familiarity with the plant and through a desire to find something American to which we could attach its name, many forms of common New England species have been passing as *Aster tardiflorus*. On the other hand, most of the American material of true *A. tardiflorus* has been called *A. patulus*, Lam. That the two species are identical there can be no doubt. They were both described from specimens introduced into European gardens from north-eastern America, and as *A. tardiflorus* was published by Linnæus twenty years before Lamarck described *A. patulus*, the Linnæan name should be reserved for the plant.

Aster tardiflorus is not generally a common plant. It is found in its greatest development, perhaps, in the valleys of the White Mountains, whence the Messrs. Faxon annually bring many puzzling, but interesting, forms. The plant is generally, though locally, distributed through Maine and western New Brunswick, and it has been collected at a number of points in Vermont. Two extreme stations occur in Massachusetts, but west of New England the occurrence of the species is not yet clearly known.

Like most of our other New England Asters, *A. tardiflorus* shows a strong tendency to intergrade with a large number of species. The specimens examined both in the herbarium and in the field pass by various degrees of modification to *A. Novi-Belgii*, *A. longifolius*, *A. puniceus*, *A. Lindleyanus* and *A. prenanthoides*, yet the typical plant will hardly be confused with any of these. Mr. Faxon's drawing (see p. 15) shows the typical form of the plant. In fact, it may be taken as the best available representative of the species, for the drawing is made from specimens which were cultivated at Kew in 1881 as *A. patulus*, and which, after comparison in the Linnæan herbarium, Dr. Gray marked, "This would answer quite to the flowering specimen in herb. Linn. of *A. tardiflorus*."

The species is not always so smooth as represented in the drawing, but it passes gradually from the glabrous plant to a form in central Maine and the White Mountains, with the stems and the midribs beneath densely white-villous. A form in Maine and eastern Massachusetts having elongated and narrow leaves with stout and scattered salient teeth and a very contracted inflorescence is the var. *lanceifolius*, Fernald. Another striking form which has been described at some length in the article previously cited is what may be a hybrid between *Aster puniceus* and *A. tardiflorus*, var. *lanceifolius*. The plant is striking and unique, with its puniceous like stem, short, dense inflorescence of showy heads, and leaves intermediate in outline between the two supposed parents. This plant has been found in some abundance at several places in eastern Massachusetts the past autumn, and further study is necessary before its true affinity can be determined.

Gray Herbarium, Cambridge, Mass.

Merritt L. Fernald.

* Bot. Gaz., xxi., 275.



Fig. 4.—*Aster tardiflorus*, L.—See page 14.

Cultural Department.

Tender Sub-aquatic Plants.

EICHORNEA CRASSIPES and *E. azurea* succeed well in soil which is continually soaked with water, and if the soil be enriched with cow manure the display of bloom after midsummer is much superior to that on floating plants. Self-sown seeds of these two species germinate out-of-doors here after lying in the ground all winter, and the seedlings in their turn ripen seed, so that in places where the surroundings are favorable they may become naturalized. Another plant which does best where there is a continual supply of moisture is the Parrot's Feather, *Myriophyllum proserpinacoides*. It has rather inconspicuous flowers; the foliage, however, is of such a pleasing shade that it is always welcome. When grown in water, the foliage under the surface is much finer or thread-like than that above. Last summer I saw some plants of it grown in tubs of moss mixed with manure, the bottoms of the tubs just resting in the water of a lily pond; it was during the middle of June, and even at that early date the sides of the tubs were entirely covered with the long feathery growths. Although a native of Brazil it is perfectly hardy here.

We have several desirable species of *Cyperus*, and among the dwarf kinds we find *C. alternifolius* and its variegated form the best for margins of lakes, where, if planted early, they make a fair show before the summer is far advanced. The variegated form is slower in growing than the other. *C. Papyrus*, known also as *Papyrus Antiquorum*, although often successfully used as an aquatic, will do well where the soil is fairly moist. In positions of this kind the stems are stouter and better able to withstand high winds. Both of these are tender and require greenhouse protection during winter. *C. Papyrus* often ripens seeds, and these, if sown as soon as ripe in finely chopped sphagnum moss, kept moist and placed in heat, germinate freely.

Gunnera scabra and *G. manicata* are desirable for their foliage on the margins of ponds. They will not endure much frost, however, and are a trifle difficult to raise from seed. A plant much easier of cultivation, with almost as handsome foliage, is the Chinese Rice Paper Tree, *Aralia papyrifera* (Fatsia), which will grow ten feet high from strong roots or crowns in a single season. It is not reliably hardy north of Washington. In most places ashes or rough litter over the crowns will preserve it. It is propagated from cuttings of the root about the thickness of one's finger and two or three inches long. If these are put in pots in a cool propagating-house, they will make full-sized plants the following season. Two species of *Thalia*, *T. divaricata* and *T. dealbata*, do admirably where they can have a little extra attention in the shape of good soil. *P. divaricata* is the larger of the two, having leaf-blades nearly a foot long and six inches broad on stalks two to three feet long. The small purple flowers are borne on scapes from three to five feet high. The foliage of both resembles that of some species of *Canna*, to which genus they are closely related. *Stromanthe sanguinea*, belonging to the same family, has proved fairly satisfactory, the past two seasons, in situations partly shaded from the sun. Two of the best-known *Colocasias*, *C. esculenta* and *C. odorata*, give quick results where broad tropical foliage is needed. *C. esculenta* is stemless, with the leaves pointing to the ground. *C. odorata* has the foliage more upright and is the more rapid-growing of the two. It has thick succulent stems, sometimes six feet long. Where color is wanted the fancy-leaved *Caladiums* are quite at home where they have rich damp soil to grow in. Those kinds lately introduced with very highly colored leaves should be avoided, as they do not succeed nearly as well as some of the older sorts, such as *Bicolor*, *Dr. Lindley*, *Rossini*, *Duchartre Cannartii*, *Beethoven*, *Uranus* and *Pictum*. The bulbs should be started indoors and put in their summer quarters late in May or early in June, as when put out earlier, they are apt to get a check from which they need some time to recover.

Botanic Garden, Washington, D. C.

G. W. Oliver.

Seasonable Work.

SILENE pendula is among the showiest of early-blooming plants useful for spring bedding. It is a biennial, and naturally would sow itself one season and bloom the next. Under cultivation our summer-sown seedlings have invariably died during the succeeding winter, although protected, while, curious to note, such as were self-sown stood unprotected. We do just as well by making a sowing indoors, during late January or February. The seed germinates in about three weeks, and the seedlings are transplanted as soon as large enough to

handle. Unless well aired they damp off easily, and we place the flats on shelves near the glass. They remain here until the end of March, when we shift them into cold frames to harden, a few weeks before planting time. The plants commence blooming early in May and remain in full beauty for the whole of the month. One merit of *S. pendula* as a bedding plant is that it never looks untidy.

Vinca rosea and its white variety make an attractive mixture for summer bedding. It is slow work to get a stock of it, for it germinates slowly, and even then almost stands still, and not until we can give it a little bottom-heat does it make any growth to speak of. It is one of the most beautiful plants for a summer display, and helps greatly to vary the too frequent repetition of *Coleus* and *Geranium*.

Spring is already approaching, and what can be done now is so much gain of time. Unless it be the dwarf variety of *Salvia splendens*, which must be propagated from cuttings to keep it even in growth and in time of blooming, plants of *Salvia* may be raised from seed with less trouble. *Solanum capsicastrum*, otherwise known as the Jerusalem Cherry, although a native of Brazil, is a very ornamental berry-bearing plant. Seeds should be sown early to have the plants make a good setting outdoors before autumn. We have a good strain, which always comes true. Much of the store seed is mixed, and therefore many growers select a well-berried and neatly bushy plant for propagating by means of cuttings. The seeds should be put in now. Seeds of *Dracæna australis* come quite freely, and when sown early and planted out in rich soil, under good culture, they make neat plants for winter decoration. The following season we use them for subtropical gardening, and afterward throw all but a few of the best away, having meanwhile raised a new lot. *Grevillea robusta* we treat in the same way. One-year-old plants are exceedingly pretty, averaging from one to two feet in height. They come in handy the following season for bedding purposes, and as centre plants nothing is more graceful. *Eucalyptus globulus* is another of this class, but its usefulness usually ends with one season. It may be used the following winter for grouping, where its blue-green leaves have a striking effect, but it loses its leaves badly and soon becomes unsightly. Seed of single *Dahlias* should be sown early to have bloom in good season. *Mirabilis Jalapa*, *Marvel of Peru*, is an exceedingly showy border plant. That it is common, or once was, should be nothing against it. A month or six weeks may be gained by sowing the seeds now. *Maurandya Barclayana* is a pretty little climber, and an equally beautiful plant for gracing the edges of vases and of hanging baskets, where there is plenty of sunshine. Its large Pentstemon-like flowers of violet and white are exceedingly pretty. The showy perennial, *Gaillardia grandiflora*, is more satisfactory when treated as an annual sown early. The single forms of *Pyrethrum roseum* make splendid border plants and are among the most useful for cutting. In the Old Country large collections of named varieties, mostly double, are kept up. The climate there is more favorable than ours, and they grow readily. They stand our winters better than the summers, and usually die out after a year or two. A continuous display of the single forms is maintained more easily by sowing a lot every spring. Those who like the perennial *Lupines* will be pleased with some of the annual kinds. *Lupinus nanus* is low-growing and pretty. *Lobelia cardinalis* and *L. fulgens* *Victoria* bloom abundantly all through the autumn from spring-sown seed. These handsome plants naturally grow in wet soils, but we have had them do quite well in dry positions. *Campanula Carpathica* blooms abundantly from July onwards, when sown early, as do *Larkspurs*, *Antirrhinums*, *Pentstemons* and *Violas*.

At the place of H. H. Hunnewell, Esq., there are several small bushy specimens of *Bougainvillea Sanderiana*. This handsome novelty resembles, in the color, shape and arrangement of its flowers, the older *B. glabra*, and like it has a more continuous period of bloom than the still older and coarser *B. spectabilis*. Though quite as spiny as *B. spectabilis*, it is in no sense a climber. The habit is erect; the plant is short-jointed and blooms on the ends of all the shoots. Mr. Harris trimmed off the side shoots from one plant, with the intention of making a standard of it. Fresh shoots appeared all along the stem, and each one was full of bloom, although but a few inches in length. The *Socotrana* hybrid *Begonia*, *Gloire de Lorraine*, noted five weeks ago, is still in perfect bloom. It is, without doubt, the loveliest winter-flowering *Begonia* ever raised. *Clematis indivisa* promises to be better than ever this season. It will cover nearly four hundred square feet of the roof. No better place could be found for this handsome winter-flowering *Clematis* from the antipodes. It has a cool place in summer, quite free from the stimulating effects of

bright sunshine in the orangery, facing north-west. The flower-buds are now showing, and in the course of a month it will be worth going a long way to see. The conservatories are gay with *Cinerarias*, *Cyclamens*, *Primulas*, *Cytisus racemosus* and *C. elegans*, *Eupatoriums*, *Antirrhinums*, *Coreopsis Drummondii*, *Euphorbia fulgens* and *E. pulcherrima*, *Lantanas*, *Impatiens Sultani*, *Statice Holfordii*, *Freessias*, *Libonias* and many other plants. *Daphne Indica*, *Begonia nitida*, *Freessias*, *Mignonette* and *Violets* emit a pleasant perfume.

Wellesley, Mass.

T. D. Hatfield.

Garden Phlox.

THE varieties of garden Phlox are doubtless more useful for summer decoration than any other one class of plants. They are in bloom for three to four months of the year, and few hardy border plants give as much satisfaction for the little care required. Perhaps the slight attention they need is a drawback to their cultivation, as the general impression is that it is only necessary to set out the plants and the work is done. There could not be a greater mistake made with regard to garden Phlox, or, indeed, any other garden plant of value, and only such plants as Dandelion and Purslane take care of themselves.

All highly developed plants, such as Phlox, Double Pyrethrum and Larkspur, are the result of rigid selection and attention, and the tendency is to revert or degenerate to original types. How often when passing a neglected wayside garden do we see near the fence a few Tiger Lilies, a clump of Pæony, and almost inevitably a few tall stems of the old purple Phlox. If the latter is closely examined it will be found to be almost identical with *P. paniculata*, from which all of this class sprang. No matter how intricate the pathway up to the florist's standard of a good type of garden flower, it is only a step or two back to original principles, and any one who grows such plants in the garden knows that it is more trouble to weed out these reversions each year than to eradicate true weeds. The highly developed varieties of garden plants must be nursed and fed according to their needs. Phlox is a great feeder and requires a constant supply of rich food to keep it in good health. A strong clump will die out, not at once, perhaps, but in a season or two, simply from lack of nourishment. Before it dies an abundance of seed will have been scattered, and the weaker the parent plant, the greater the proportion of fertile seeds, for this is nature's method of perpetuating its kind. The result the next year is a quantity of degenerates in the border, and sometimes there is a tendency of the original plant to revert.

There are three well marked divisions of border Phlox. One has *P. suffruticosa* as its parent, and is not so often in evidence as the other two that owe allegiance to *P. paniculata*. From this species there are two sections, one early-flowering and dwarf, and the other is taller and flowers late in summer. These two last named are the ones of most value, from which we have the best forms with brightest colors. There is not much to choose between the productions of Lemoine in France and Kelway in England. Lemoine was the pioneer in this, as in other great advances with garden plants, while Kelway has carried on the work and done much to distribute his plants. A list of the best sorts is scarcely needed here, and would be a repetition of lists already published.

The longevity of these plants depends on their propagation. If only a few reserve plants are needed to keep up the supply, the clumps should be lifted in spring as soon as frost will permit. They should be divided carefully and the pieces replanted in fresh soil. If a larger number is required, the clumps should be placed in a warm greenhouse or hot-bed until they send up young shoots. These should be taken off as soon as long enough, when they will root freely. If grown in pots and hardened off they may be set outdoors in early summer, and they will flower freely at the proper time. Only one large head will be produced the first year, but thereafter the roots will increase rapidly. If a quantity of summer decorative plants in pots are required, some may be kept and grown on in pots, giving them a shift as they need it, and few plants will give greater color-effects than good garden Phlox grown in this way. It is also possible to prolong the season of flowering by taking off the flower-head as soon as it appears. The dormant side-shoots will then develop, and the display will be equally good, but later.

Like many other of our best garden plants, these are purely North American. The original species was found here, but was developed in Europe, as were *Pentstemon*s, and more recently the common wayside *Aster*. The latter are fertile in good forms of garden origin, but these do not seem to have yet recrossed the Atlantic.

South Lancaster, Mass.

E. O. Orpet.

Seedling Orchids.—We have had in flower here for six weeks past a seedling *Cattleya*, a hybrid between *C. intermedia* and *C. Mossiae*. The flowers are much larger and in every way a decided improvement on those of *C. intermedia*, the sepals and petals being a delicate light rose, and the labellum blotched with purple and yellow extending well up into the throat. The pseudo-bulbs are nearly a foot long, with two large dark green coriaceous leaves at the apex. A robust-growing *Cypripedium* now flowering is a seedling of *C. Ashburtoniae* and *C. Curtisii*. It has flowers as often as three times a year. It has a large dorsal sepal with a deep band of white which ends with a shading of light green. The petals are shaded light purple with numerous spots, and the dark hairs extend the entire length on both the upper and lower margins. The pouch is large and reddish brown, and altogether it seems to be an admirable plant to breed from. Another is a seedling of *C. Javanicum* crossed with *C. ciliolare*, a strong grower, producing two flowers on a stem, large dorsal sepal white with light rose-colored veins, petals light green spotted, and a pouch light red. We have several seedlings of *C. speciosum* crossed with other species and varieties, many of them in flower and others coming on, and although we have none which present any decided improvements either in richness of coloring or grace of form, they amply repay all our trouble, and we are assured that any one with even a small collection of Orchids can derive a great deal of profit and pleasure by crossing them and raising seedlings.

Tarrytown, N. Y.

William Magee, Jr.

Correspondence.

Orange Groves as an Investment.

To the Editor of GARDEN AND FOREST:

Sir,—Mass meetings are now being held throughout California to ask Congress for increased duties upon importations of such foreign-grown fruits as compete with those grown in this country. Among the most interesting facts brought out during the discussions is a careful and exact estimate by an experienced orange grower of the cost of the high-class Orange groves in the San Bernardino valley and adjacent districts, which are now producing the fancy fruit that commands the highest price, and of the annual product which may be expected from those groves. I have never seen such candid figures upon this subject in print, and they may be of interest to some of your readers.

The initial cost of these groves was \$250 an acre for the land, \$100 an acre for the water-rights, \$50 for grading and preparing to plant the trees, \$100 an acre for the young trees and \$50 for the planting and staking, making the capital invested at the outset \$550 an acre. The use of money in California costs ten per cent. per annum, and interest should therefore be figured at that rate. The care of a grove costs, on an average, \$20 an acre yearly. There are assessments upon the water stock, to pay the expenses of caring for the plant and of delivering the water to consumers, amounting to \$4 an acre annually. With these expenses each year the investment amounts to \$629 at the beginning of the second year, \$715.90 at the beginning of the third year and \$811.50 the fourth year. At the end of the fourth year \$20 may be deducted as the value of ten boxes of oranges; \$50 may be deducted the fifth year for twenty-five boxes, and \$100 the sixth year for fifty boxes. Adding the expenses as above and deducting these amounts, the net cost at the commencement of the seventh year is \$980 an acre. The expenses of interest, etc., during this year amount to \$122, and a yield of 100 boxes may be expected, worth \$200, net, thus leaving a profit of \$78 above expenses the seventh year.

In this estimate taxes are not considered, because they vary with location and other conditions. But it is safe to assume that the taxes for the seven years will wipe out the profit of the seventh year and add \$20 to the cost of the grove, thus making the cost at the commencement of the eighth year an even \$1,000. The production from this time on increases rapidly, until, in the tenth year, it should amount to 300 boxes an acre, worth, at present prices, from \$450 to \$600, and giving a net return of from \$350 to \$450, or about forty per cent. upon the investment. These figures are estimated upon the cost of a Navel Orange grove, but the average seedling grove will probably bring equal returns, because it will bear more fruit, although it will be two or three years longer in coming into full bearing.

While many groves, even in favored districts, do not produce the above amount of fruit, that product may now be rendered almost a mathematical certainty by following ap-

proved methods of planting and care determined after long and expensive experience, which pioneers in the industry lacked. The details of preparing the ground, selecting the nursery stock, pruning, cultivating and fertilizing are all important. For instance, many growers heretofore have headed their trees at least four feet above the ground, simply because a tree of that shape looked better to them. But it has been proved that trees which are allowed to branch only a foot or eighteen inches above the ground produce much more fruit, especially in the early years. The Orange-tree begins to bear near the ground; as it grows older the upper branches become stronger and gradually put forth fruit, and the new growth of this year bears oranges next year. Therefore a tree should be headed low and given as many strong limbs as it will carry, with care in preserving new wood and in pruning, so that sufficient light and air may penetrate the foliage to mature the fruit on the inner branches. The more skillfully it is pruned the nearer will the tree finally approximate to the ideal of bearing oranges from top to bottom the entire length of the branches. The use of suitable commercial fertilizers, even on young orchards, is repaid by many times its cost, yet it has been taken for granted by many inexperienced planters that the virgin soil of southern California, which is principally decomposed granite from the mountain ranges, requires no fertilizing whatever for many years. Inexperience and misconceptions in these matters have frequently caused disappointment in the yield of bearing groves.

Many people who plant orchards with an imperfect understanding of these conditions and, perhaps, with purses too light to stand the strain of such incessant and long-continued demands grow weary of the struggle and offer their properties for sale below their cost. Good orchards in favored locations, from four to six years of age, may be had to-day at from \$500 to \$800 an acre. Many growers, too, commence without an understanding of the competition which they are likely to meet, and later become alarmed when they read about the millions of Orange and Lemon trees that have been planted in southern California.

These are the prices of the best groves, in a few of the districts which have the greatest natural advantages, such as freedom from frost and certainty of water supply. They were based, perhaps, too largely upon the prices obtained for oranges several years ago when the total product of the state was only a few hundred car-loads, and they should now be revised with reference to the fact that southern California now has a million and a quarter Orange-trees in bearing, and a million and three-quarters planted but not yet in bearing, with a quarter of a million Lemon-trees in bearing, and a million planted and coming into bearing. This makes the astounding total of four and a quarter million Citrus-trees of these two kinds which will soon be producing, an increase which the wildest boomer of six years ago would not have predicted. Competition will doubtless bring down the price of oranges, and consequently the value of the groves. There will be an increasing competition from the groves of Florida. It is an open question whether these groves will be worth as much five years from now as they are worth to-day.

The nearly half a million acres of Citrus fruits in southern California represent investments of probably \$35,000,000, and the holders of these properties think that they are now important enough to be worth protecting. The amount of protection which will be asked for has not been decided, but it will not be less than fifty cents upon each box of oranges, lemons or limes holding two cubic feet, and an equal rate upon these fruits by weight or bulk in other packages. The fruit industries of northern California, which run more largely to canned and dried fruits, will have similar requests to make. The outcome will be awaited with anxiety by a little army of fruit growers in all parts of the Golden state.

Redlands, Calif.

William M. Tisdale.

Need of Instruction in Experimental Plant Physiology.

To the Editor of GARDEN AND FOREST:

Sir,—In making up the report of the section on horticulture and botany for the recent meeting of the Association of American Agricultural Colleges and Experiment Stations, one of the questions asked, in a circular letter sent out to the horticulturists and botanists of the various states, was, "What attempt is made to teach experimental plant physiology?" The replies indicate that in more than half of the institutions heard from little or nothing is being done along this line. This, of course, does not mean that there is no incidental class-room instruction or mention of topics falling under this head, but it does

mean that no course is offered in which the student makes it his especial aim to get at the functions of plants by means of experiments carried on by himself. In the report made before the Association this matter was emphasized, and it was urged that this subject ought to be pushed to the front and so arranged that students who expect to deal with living plants should have the opportunity to get instruction in such matters.

Without any knowledge of this report of the chairman, Dr. G. E. Stone, of Massachusetts, presented a strong paper, in which he emphasized the importance of the same subject. The term plant physiology is one which has been vaguely used, and Dr. Stone called attention to the limits which should be placed around it. As commonly accepted, plant physiology embraces the following subdivisions: (1) Nutrition; (2) Growth; (3) Physics of vegetation; (4) Plant movements; (5) Reproduction. The latter subject manifestly occupies a somewhat different position from the others and is now being given over to the domain of ecology. It is evident that in the subjects of nutrition, growth and physics of vegetation, which include the relations of the plant to heat, light, moisture, etc., we deal with problems of the greatest practical moment to the horticulturist. The discussion which followed the paper above mentioned showed that the horticulturists present appreciated this fact and were anxious to secure better training for their students along such lines, and some of them have tried to supply such teaching themselves. To urge the need of such knowledge to the horticulturist when his success or failure depends upon his being able to aid the plant in carrying on these functions, or to provide it with such surroundings as will enable it best to do this, seems superfluous. Yet little attention has been given to this kind of instruction, and least of all to the particular class of students who are most in need of it. If these things are essential to the commercial horticulturist, how much more are they needed by the horticultural teacher and experimenter? Scarcely an experiment connected with practical cultural problems can be completed without coming in contact with just these questions which it is the province of physiological botany to elucidate. In order to put this statement to a practical test I turned to the outline of our own horticultural experiments for the past season, and ran over the topics there represented. Thirty of these would either directly or indirectly deal with questions falling within the domain of plant physiology, while sixteen apparently would not, although even here it would not be surprising to find such problems creeping in at unexpected places. The value of this work, therefore, cannot be questioned, and the botanists will, no doubt, stand ready to do their part if they but recognize that there is a real demand and need for such instruction. Let me here emphasize the word experimental, as connected with the title. To be of real value to the student he must prove all things as he goes. He must not merely take the statement that things are so, nor stand by and see the professor prove that they are so. This, of course, means study and thought on the part of the teacher, and it also means apparatus and expense, but the results will justify the cost. In order that the work shall be of most value it is evident that the student should have had some previous instruction in other lines of botany, yet this may not be absolutely essential, and if it is possible that instruction can be arranged which is so simple that it can be followed with profit by the farm boy who comes but for a hasty sip of knowledge during the midwinter months, much will be gained. I fear that many horticulturists, like myself, feel the need of these things more from want than from the possession of them. Many desirable things must be omitted from every education, but is it not reasonable to believe that a knowledge of the functions of life of the few plants with which he deals is of greater importance to the horticulturist than a knowledge of the name and classification of the many plants which he seldom or never sees?

University of Nebraska.

Fred W. Card.

Chrysanthemums Out-of-doors.

To the Editor of GARDEN AND FOREST:

Sir,—I note in your issue of December 9th the record of an attempt by one of your correspondents to mass Chrysanthemums as a feature of landscape-gardening. This is not an easy problem, because the Chrysanthemum flower is so large and conspicuous. If we mass dozens of the same colors, attempts to blend them agreeably are futile, because the quantity of each color is too overpowering. The shrubs mentioned by your correspondent as bearing bright berries and growing among the Chrysanthemums, and shrubs retaining foliage very late, would make the best material for uniting them, and

perhaps a better result would be obtained if the order were reversed, Chrysanthemums used to connect the shrubs—that is, mass the shrubbery somewhat and let Chrysanthemums come up in an unstudied way, without much arrangement, between the groups and sometimes among them as to colors.

A few years ago a load of rubbish from the flower garden—dried stems of Hollyhock, Zinnia and Calliopsis—was dumped upon a strip of ground in the rear of some outbuildings. A little later this was burned and the ground plowed. For some reason this bit of ground was not needed and received no cultivation. In due time it bore a fine crop of grasses and weeds, but by summer-time the flowering plants asserted themselves and presented a dazzling mixture of almost every conceivable color, yet it was never perplexing or tiresome to the eye. The blossoms of Zinnia are all the time changing as they advance toward maturity. In this case none of the flowering plants attained very large size; they grew with the grasses and weeds, many of the latter outgrowing the flowers a little and making, with the various kinds of grasses, a perfect blending of color. This impromptu flower-bed never failed to produce a most pleasurable surprise when one had to pass in sight of it. This wild flower-bed leads me to suggest that if Chrysanthemums were planted among and between groups of shrubbery—and without arrangement—as if they had come up spontaneously, they might be effective out-of-doors.

Savannah, Ga.

Paul Le Hardy.

The Palmetto Scale.

To the Editor of GARDEN AND FOREST:

Sir,—In 1883 Professor Comstock described a new species, *Aspidiotus sabalis*, found on leaves of Palmetto in Florida. The species is very peculiar, and has lately been made the type of a new genus (*Comstockiella*). Up to the present time it had never been observed on the Pacific coast; but Mr. Alexander Craw, the horticultural quarantine officer of California, has just sent me specimens on leaves of Palms from Mexico which had been brought to the port of San Francisco on November 17th. The scale was new to Mr. Craw, but he wisely had the Palms destroyed, so as to avoid all possibility of the introduction of the creature into California. Mr. Craw thinks the Palms came from near Mazatlan, and were growing wild about seventy-five or one hundred miles inland.

This scale should be looked out for by importers of Palms. It is about the size and shape of a pin's head, pure snow-white, without any yellow or black spot. The male scales are similar in color, but smaller and elongated. Mr. Craw's Mexican specimens represent a variety (*v. Mexicana*) distinguished from the Florida form by the female (under the scale) being orange-yellow, and the ventral grouped glands numbering, caudolaterals 14 to 17, mediolaterals 11 to 15, cephalolaterals 7 to 10, the respective numbers for the type (from Florida) being 6 to 10, 4 to 7, and 4. But these are microscopical details, and for horticultural purposes it is probable that the two forms may be treated as one.

Mesilla, N. M.

T. D. A. Cockerell.

Recent Publications.

Under the direction of the Department of Agriculture, Dr. Erwin S. Smith has prepared a bulletin relating to *A Bacterial Disease of Tomatoes, Eggplants and Irish Potatoes*, besides other members of the same family. This bacillus was first brought to notice by Dr. Halsted, who considered it identical with the micro-organism which causes the Bacterial Wilt in Cucumbers and Canteloupes. But microscopic examination of infected Tomato-stems from Mississippi showed that they swarmed with bacteria of a different kind. Healthy Tomato and Potato plants were inoculated with pure cultures of this bacillus, and they rapidly succumbed to the disease and became ultimately a mass of disorganized and ill-smelling slime. As it appears in the field the farmer first detects the malady by the sudden wilting of the foliage of his plants. In the case of the Potato the tubers are ultimately attacked and destroyed. In southern Mississippi the losses of the Tomato crop have amounted to thousands of dollars. Indeed, the disease has been so destructive in many places that entire fields have been destroyed year after year, so that the cultivation of this crop for market has been abandoned. About Charleston, South Carolina, whole fields of Tomatoes and Eggplants have been destroyed and the early

Potato crop seriously injured. Many of the tubers that appeared sound on digging rotted on the way to market. It is not a new disease, and it certainly occurs as far north as New York, and probably it has been confounded with other diseases of the Potato and Tomato, for it is unquestionably true that only a small part of the so-called Potato-rot is due to the well-known Potato-mildew, *Phytophthora infestans*. How serious this matter is can be imagined when it is estimated that the loss to the potato crop in a single year from the rot has exceeded 50,000,000 bushels.

An interesting fact brought out in this bulletin is that the Colorado potato beetle is prominent as an agent in distributing this disease, as experiments in the greenhouses of Dr. Smith have clearly demonstrated. The direct injury from bites and punctures is not the only one inflicted by the beetles, and often not the worst one. Given one diseased plant in a field and plenty of insects to feed upon it, and the transmission of the infection to all parts of the field, and thence to the whole neighborhood, is only a question of a few weeks. No experiments have been made with other insects, but it is possible that flea beetles, blister beetles and many other species which feed on leaves may act as carriers of the virus. Of course, this gives an added reason for the prompt destruction of the leaf-eating and leaf-puncturing insects. Another preventive measure is the destruction of diseased plants, a precaution which should be begun early in the season. When the disease has become widespread among Tomatoes and Eggplants there is no help for it. In the case of potatoes a considerable part of the tubers may be saved if they are dug before the vines have shriveled and stored in a dry place. Since this organism may probably live over winter in the soil of the Potato and Tomato fields, it is a good precautionary measure to plant Tomatoes, Eggplants and Potatoes in new ground, or at least in land where neither of these crops has been raised for several years. It is also safer to select seed and tubers from plants grown where this disease does not prevail. Altogether, this little bulletin, No. 12, from the Division of Vegetable Physiology and Pathology, although it only occupies twenty-five pages, is a most interesting and instructive monograph. It has half-tone pictures of healthy and infected plants of Potato and Tomato, and a colored plate illustrating the brown rot of the Potato, *Bacillus Solanacearum*, n. sp. Students of vegetable pathology will be glad to find a table of contrasting characters which points out the differences between *Bacillus Solanacearum* and *B. tracheiphilus*, the organism which causes the Cucumber Wilt; and another table, showing the difference between the *Bacillus Solanacearum* and the bacillus producing the Potato rot described by Dr. Ernst Kramer, without name, in 1891.

Notes.

Forty years ago the annual import of oranges into England did not exceed 40,000 cases, while during the last year three million cases were put on the English market.

Unusually large quantities of cocoanuts have been imported recently, and in December 1,174,000 were received at this port from Porto Rico and other West Indian islands.

A pure white sport of the pink Carnation, William Scott, is now being raised in some quantity by Mr. John Harrison, of Jersey City, under the name of Harrison's White. It promises to be a valuable commercial variety.

A Boston correspondent of *The American Florist* states that branches of the California Pepper Tree, *Schinus molle*, has lately been received in good condition in that city from California. It is suggested that the long drooping branches of this tree, with its graceful pinnate foliage and deep pink berries, would make a good addition to the material used for decorative purposes at Christmas.

A correspondent makes inquiry for a good application for covering the wounds of trees where large limbs have been cut away. For the treatment of trees on a large scale we know of nothing better than an application of coal tar, which is sufficient to exclude the air and the germs of destructive fungi. In a recent number of *The Rural New-Yorker* several prominent orchard-

ists recommend good grafting wax as the best application for wounds of Apple-trees where large branches have been removed. This should be applied as soon as possible after the amputation, and it should be pressed closely to the surface, where it will remain sometimes three or four years. Gum shellac, such as painters use for covering knots, is good, but it needs to be renewed the second year.

The vegetable known as Chocho or Chow Chow, and occasionally seen in the New York markets, is said by *The Gardeners' Chronicle* to have become more generally known and used in London, last year, than it ever before has been, so that it forms a part of the stock of greengrocers in almost every town of considerable size in England. *Sechium edule* belongs to the Gourd family and is a perennial which will grow in our southern states. Both the fruit and the large tuberous root make excellent food for animals, while the plant itself is a quick-growing climber, useful for training over fences to hide unsightly objects. Inasmuch as the fruit is picked before it is ripe it can be transported safely from the West Indies, and since it is said to be very palatable as well as nutritious its speedy introduction as a regular market vegetable in this city ought to be looked for as certain.

The Endive is usually esteemed as a salad plant, but some people consider it too bitter for that purpose, and Professor Waugh states in a late bulletin that it makes most excellent greens when cooked. The variety known as the Ever White Curled does not run quickly to seed, and when blanched like Celery or Cos Lettuce by tying up the leaves or drawing the soil up about the plant it makes an attractive salad plant. For eating cooked, however, it is best to take the plants when very young before they have time to make heads and when they are in their tenderest stage. The seed can be sown early in cold frames or in the open ground like Lettuce, and, of course, plants can be grown in from forty to fifty days at any time during the summer, but in the very hottest weather they are not of the best quality. Autumn-grown plants can be taken up with some earth adhering to the roots and stored in a dry cellar or in a cold frame for winter use.

White, red and yellow onions of many qualities are now in market, from Cuba, Bermuda, Spain and different sections of this country. Among fresh vegetables recently come into season are beets, from Florida. Other receipts from this state are tomatoes, string-beans, peas and eggplants, all of which are too abundant in inferior grades, while choice stock is scarce. Lettuce from the same section, peppers, cymplings, or scalloped squashes, and cucumbers are of fair quality. Besides domestic cabbage, some is imported from Denmark. Kale and spinach, from Virginia, are plentiful, and much of it in poor condition, so that the prices realized here do not cover the cost of freight. Only exceptionally good lots of spinach realize as much as \$1.00 a barrel in the wholesale markets. Cauliflower is now arriving from California and from near-by places. Parsnips, carrots, celery, pumpkins, Marrow and Hubbard squashes, turnips, from Canada and from neighboring states, are among the staple winter vegetables, with sweet potatoes from southern New Jersey, and potatoes from Bermuda, Maine, Michigan and New York.

The receipts of Jamaica oranges have been gradually falling off, 2,900 barrels arriving during last week. Altogether, 237,530 barrels of this fruit have been sold here this season, while in the same period a year ago the importations amounted to but 194,496 barrels. These oranges come in barrels, and are assorted and repacked here in boxes similar to those used in Florida. Seven dollars a barrel is the highest wholesale price for sound fruit at this time, and \$3.00 for a box. The experiment was made several weeks ago of sending 2,000 boxes to England, but, while the oranges were in good condition on landing, they spoiled quickly when unpacked, and were sold at a loss. The trade in oranges is usually dull after the midwinter holidays, but those from Florida and Jamaica have advanced in price during the past ten days. The demand is for the sweet fruit, and the tart Mediterranean oranges have declined. Bright grape-fruit, from Florida, commands \$8.00 to \$10.00 a barrel in wholesale lots; that of russet color, \$5.00 to \$6.00, and the best from Jamaica, \$5.00 to \$7.00. Tangerines, from California, cost \$5.00 to \$6.00 a box, and those from Florida sell for double this price. Only limited quantities of lemons are coming from Sicily; wholesale prices range from \$1.00 to \$3.00 a box, an advance of twenty-five cents during the past week. The lemon crop in southern California for the year beginning November 1st, 1896, is estimated at 1,000 car-loads.

Mr. Felix Gillett, in writing to the *Pacific Rural Press* on the subject of Chestnut-growing in California, says that he can graft European Chestnut-trees successfully at any time between the first of March and the first of October. His experience is that the best varieties of the European Chestnut, or Marron, will flourish well in the central and northern part of that state. Being a mountain tree, it flourishes in gorges with a sunny exposure in Nevada County up to an altitude of 3,000 feet, where trees twenty-five years old are now bearing marrons of excellent quality, and in such abundance that Thanksgiving turkey stuffed with chestnuts is quite the fashion in that region. If half the territory of California is well adapted to the cultivation of Marrons, it would seem that another important product may be added to what can be raised in that state. A tree planted in the spring of 1871 by Mr. Gillett now averages ninety pounds of nuts a year, which he can sell for fifteen cents a pound, and the tree bears crops every year. When it is remembered that Paris alone consumes 20,000,000 pounds of marrons, or dessert chestnuts, a year, and that Italy alone produces 500,000,000 pounds, one can see how important this trade is in the countries of southern Europe, where the Chestnut is called the Bread-tree, being so valuable as a food for men, and in seasons of abundant yield even for animals.

We are glad to observe that Mr. T. V. Munson, in writing for *The Park and Cemetery* of woody vines, speaks of various species of the Greenbriers (*Smilax*) as especially useful on account of the freshness and beauty of their foliage. We have frequently called attention to the rare value of these native plants, especially wherever a screen of foliage is needed. Mr. Munson also does justice to another class of native climbing plants in advocating our Grapevines for decorative use. *Vitis cordifolia*, *V. rubra*, *V. cinerea* and *V. riparia* can easily, he says, endure a temperature from fifteen to twenty degrees below zero, and they are much more beautiful than many of the climbing plants used in parks and gardens, but if nurserymen keep these native species in stock they never advertise them. The Fox Grape, *V. labrusca*, and the Summer Grape, *V. æstivalis*, Mr. Munson considers too coarse and rigid for most positions, although they often make beautiful vines. He regards *V. Munsoniana* as the finest ornamental woody vine known for the Gulf states, a species nearly related to the common Muscadine, which is much coarser. *V. Munsoniana* is a rampant grower, but slender and graceful, with small, smooth, shining toothed leaves which become a fine scarlet and crimson late in autumn. This plant will endure any amount of heat and drought, and it will survive a winter temperature of five degrees below zero. Staminate plants of Grapevines should be used for park planting, as the fruiting vines would likely be torn by boys in their raids on the grape clusters.

The *Monthly Weather Review* quotes from a memoir of Messrs. Petermann & Graftiau, published by the Academy of Sciences in Belgium, in which it is demonstrated that hoarfrost is particularly rich in nitrogenous compounds, and therefore plays an important part in adding to the stock of nitrogenous matter in the forest as well as to the purifying influence that forests exercise on atmospheric air. The frost-work attached to the branches of trees, being continually renewed, presents to the air a large surface for the absorption of all soluble matter that it carries, so that single trees and forests act like immense filters, purifying the air that circulates through them, and collecting from it nitrogenous combinations, which, being returned to the soil by a thaw, serve again as nutriment to plants, and thus reënter the vital cycle. The amount of frost which the branches hold is often much greater than their own weight, and in a measured cube which touched the extremities of the branches of a given shrub the weight of the frost-work which they held exceeded one kilogram for each cubic metre of space. Carrying out this calculation to a forest area, it is quite possible that seven pounds of nitrogen are deposited on every acre during a severe frost. When frosts are formed to such an extent as to break branches by its own weight, the quantity of nitrogen given to the soil must be very considerable. It is held, therefore, with good reason, that the frost represents a very appreciable factor in collecting the reserve of nitrogen within forest areas, and if we add to this the nitrogen contained in the rain, the dew and the fog, we can explain why, without any addition of this material, or without the intervention of those plants which collect it directly from the atmosphere, the forest vegetation is well supplied with nitrogen. These facts also show how the soil of forest areas grows richer in this element which is given to it by the detritus, or waste of woodlands.

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The North Woods.

IT is now twenty-five years since the passage of an act by the Legislature of New York providing for the appointment of seven Commissioners of Parks for the state, who were directed to inquire into the expediency of "providing for vesting in the state the title to the timbered regions lying within the counties of Lewis, Essex, Clinton, Franklin, St. Lawrence, Herkimer and Hamilton, and converting the same into a public park." That is, as long ago as 1872 there was a general recognition of the value of this region for its timber-supply, for its usefulness in preserving and maintaining the water-supply of the canals and streams of the state, for furnishing hydraulic power, and for the attraction which its picturesque scenery, its numerous lakes and its abundant game offered to the invalid, the tourist and the sportsman. This record also demonstrates that even then the attacks on the timber of this vast region had been so merciless that the Legislature had been driven to take some active interest in its preservation. In the documents prepared by these commissioners, of whom the Hon. Horatio Seymour was President, it is set forth that this broad area, once owned by the state, had been largely conveyed to purchasers who had bought it for the timber and bark it carried; that a single tract embracing more than a quarter of a million of acres had been conveyed to a corporation for five cents an acre under a scheme of speculation that was little less than fraudulent, and that the state then owned but a small fraction of the territory, and this was in detached parcels. The report also declares that the lands originally bought for their timber had been largely abandoned after this was removed as not being worth to the holders the taxes on wild lands, so that large blocks had been repeatedly sold for arrears of taxes or left in the possession of the state as not worth these claims until, in the course of time, another growth had made them desirable, when they were again bought from the state, again to be abandoned when stripped of everything worth carrying away. It was stated also that whenever a project for repurchasing this land was brought forward the owners would combine to raise the price to an unreasonable amount, so that Dr. Hough, another of the commissioners, stated two or three years

later, in a Congressional document, that "insuperable difficulties toward establishing this park were found in the fact that the soil belonged chiefly to private owners, and could not be acquired without unreasonable cost."

And now, twenty-five years later, Governor Black, in his first annual message, pronounces these words of warning and reproof: "A question too long neglected is the preservation of our forests. The state, either through indifference or false economy, has been stripped of its most valuable timber lands, has allowed its water-supply to be seriously impaired, and the most wonderful sanitarium of the world to be defaced and partially destroyed. Every element of economy and foresight is outraged by this course." And he goes on to say that private individuals, taking advantage of the state's neglect, have taken possession of more than three-fourths of the area of the entire Adirondack region, and that more than five-sevenths of the proposed Adirondack Park, which includes some 2,800,000 acres, are now held as private preserves or owned by lumbermen, much of the land being exposed to appalling and disgraceful devastation by fire and axe. When we remember that during all these years the destruction of these forests has been the theme of public discussion in the press and of reports by commission after commission, and that it has furnished matter for legislative oratory and action at every session, the result can hardly be pronounced encouraging. The report of Mr. Seymour's Commission stated that the ruin was going on unchecked, and it has been going on ever since. It seemed to the early commissioners that the land could not be acquired without unreasonable cost to the state, and it will cost the state ten times as much to-day. But something has been gained. A constitutional amendment has been adopted which, in a blind, uncivilized way, attempts to save the forests on the state lands by forbidding anybody to use them. Of course, neither state forests nor any other forests can have any direct economical value unless their products are gathered any more than a farm can be made profitable under a prohibition against harvesting any crops. The exclusion of the axe from the state woodlands, provided they are not devastated by fire or water, does, however, give them a certain assured value as a protecting cover to the land, and the people of the state showed that they were in earnest in preserving this bulwark against destruction of our state forests when they voted almost unanimously at the late election against nullifying or changing the constitutional provision. Another cheering symptom is found in the vigorous words of the new Governor, which prove that he has given some personal thought to the matter, for no more convincing statement as to the need of the preservation of these forests can be found in any public document. Following the words already quoted, Governor Black says:

More than four hundred and fifty million feet of wood and timber are cut, and more than one hundred thousand acres are stripped every year. This work of devastation is progressing fast. The banks of the lakes and rivers, and all sections accessible from either, are ravaged at such a pace that but few years more can elapse before that region, in many respects the most wonderful and valuable in the world, will be practically destroyed. The parts acquired or claimed by individuals are the best. A traveler through any desirable portion of that country is sure to be met with the charge of trespassing, for the cases are rare in which the title of the state to a desirable tract is acknowledged. Some time this deplorable condition must be rectified. Every year the loss to the state grows larger, in all cases difficult, and in some cases impossible, of recovery. The land is steadily and rapidly increasing in value. The bogus title burrows further out of sight the longer it is let alone. Witnesses die, and the only thing sure to increase is the encroachment of individuals upon the domain of the state. The enlargement of the canals will require more water, and the demand in every direction is increasing, while the supply is steadily falling off. A subject of such magnitude should not be postponed, nor conducted with the halting method which is too apt to distinguish public enterprises, in which large appropriations afford convenient resting-places in which office-

holders may grow old. Not long ago the state appropriated a million dollars to preserve the beauties of Niagara Falls. That subject is without significance compared to the Adirondack forests. Every consideration of health, pleasure, economy and safety urges the speedy consideration of this subject, and such consideration should include appropriations adequate to ascertain the nature of the titles adverse to the state, to recover where the titles are insufficient, and to purchase where they are valid. Any other course would be false and unwise economy.

It will be observed that the Governor has come to a point which his predecessors should have reached long ago. Commissions and reports and constitutional restrictions will be unavailing so long as the greater part of this region remains in private hands. The first thing needed is money to secure these lands forever for the state. This is the only salvation of the Adirondack forests. The sooner these lands are acquired by the state in fee simple the better. The cost alarmed commissioners twenty-five years ago, but we can all now see that the state would have made a wise investment if it had purchased every acre then. The land will cost more to-day, and many times as much twenty-five years hence; but in the end the state must own the North Woods, if there are any woods to own, so that every dictate of wisdom suggests that their devastation should be arrested at the earliest possible moment.

Two Years After the Great Freeze in Florida.

THE cold wave which swept over Florida in December of 1894 and February, 1895, left the orange growers of that region almost stunned by the calamity, but they were so ignorant at the time of the real damage accomplished, and there was so little information to be obtained from those who had passed through a like experience, that they were at a loss what to do in order to recover from the effects in the shortest time. Mr. H. S. Williams, a prominent orange grower of Rockledge, has therefore written for the *Indian River Advocate* a careful and minute account of the calamity, which is of great value from an historical point of view, and to this he has added some advice, based on experience, which will be useful in case the orange growers of Florida should ever again suffer from such a disaster. The whole article is of interest, even to the general reader, but our available space compels us to condense it materially.

Friday, the 28th of December, 1894, was a raw, disagreeable day, with heavy westerly winds, but there was nothing in the conditions to threaten severe frost. At sunset the thermometer stood at thirty-six, and the five o'clock mail brought word that the temperature would fall to twenty-five degrees in the northern part of the state. These figures did not indicate a destructive cold wave, but if the information had given the real temperature at Jacksonville, which was fourteen degrees, the information would have been useful. However, the record of my thermometer, together with the report from Jacksonville, satisfied me that the orange crop of the year was lost. At the break of day the thermometer marked nineteen degrees, with a north-west wind blowing hard. Ice had formed over an inch thick, oranges in the full force of the wind were frozen solid, and on Sunday morning, the 30th, the thermometer marked twenty-eight degrees and afterward rose above the freezing point. In about two weeks the fruit and leaves had nearly all dropped off the trees, and a week later they began to show signs of life. By February 1st shoots had grown from four to six inches, the older leaves were half grown, and many blossoms on the older trees had just opened. The young trees did not fare as well, and in a small three-year-old grove, fully exposed, the trees nearly all had their bark split along the upper part of the trunk, and half of them would have died without any further mishap.

On the 1st of February I was satisfied that I would have three-fourths of a crop, and while the year's income was lost the outlook was not utterly discouraging. Then came the second arctic wave which destroyed the prospects of a crop for years to come. On Thursday, February 7th, 1895, the wind was westerly again and blew as heavily as it did on the 28th of December, but it was not as cold. At dusk the thermometer marked fifty degrees and a meagre weather dispatch

gave no warning that the temperature would fall even to the freezing point. During the night, however, it fell rapidly, and at daybreak marked twenty degrees as before. The temperature all day was near the freezing point, and on Saturday morning it was again nineteen degrees, with ice an inch thick. Saturday it moderated somewhat, and by night the thermometer marked forty degrees, but fell again to ten degrees during the night. This unprecedented fall of thirty degrees in one night was, of course, beyond all former record, and could not have been anticipated without some definite information from the Weather Service Bureau. No one knew how bad we were hurt or what it was best to do, but on Saturday I wrapped the trunks of twenty of my largest trees with burlaps, taking care to protect the bark fully from the sun. On Monday I cut several trees down to the first branch and waited, with such a show of patience as I could command, to see what nature was going to do toward recuperation. It was a terrible ordeal, for the suspense was one of months, for even in the following June we could not tell how much damage had been done, and, in fact, after a lapse of two full seasons I am still uncertain. As a rule, my trees were budded low and on sour stock. In April they began to show signs of life, varying from two to fifteen feet above the ground. Practically all the branches were killed back to the main trunk. Some trees were killed to the ground on the south side, while they threw out vigorous sprouts for two or three feet above the ground on the north. East of the ridge that runs through Rockledge hammock parallel to the river ninety per cent. of my trees threw out sprouts above the bud. Most of the young trees west of the ridge were sawed off even with the ground as soon after the February freeze as possible. Some of the sprouts on the trunk, where the wood did not have vigor enough to sustain life, being a mere shell under the bark, have died during the past years, but not as many as I expected. The crop for the season of 1894-95 was ten oranges. The crop for 1895-96 may be twenty boxes. Owing to the larger portion of roots compared with top there is an excess of sap and food taken up, and the fruit is somewhat coarse. Some of the trees had the red rust, which caused the fruit to split, but this will rapidly disappear as the roots and tops become balanced. The present condition of the trees is satisfactory in the main, and the fruit-bearing wood should give us next year a fair crop, say twenty or more boxes where we now count one. The rapid growth of this new fruit-producing wood will tax our ingenuity to keep it from being crushed by its own weight, as the sprouts have in many instances only a thin shell of live wood to give them strength. These sprouts grow at an angle of forty-five degrees, and when weighted with fruit will need to be supported with the greatest care, or the high winds will break them off, and if exposed to a West Indian cyclone it will be impossible to save them. Buds put in during the summer of 1895 have grown prodigiously, and will soon commence fruiting. The rich, dark appearance of the trees as they glisten in the bright sunshine gives us hope for the future, although much time must elapse under the most favorable conditions before we can fully recover our lost revenues.

In the light of experience I would change my plans but little. If all the trunks of my trees had been well wrapped the morning after the second cold wave, or, better yet, the day before, if the Weather Bureau had given us notice in time, this would have proved of incalculable benefit. I would then cut off the lower branches and the top immediately above the fork. Trees treated in this way are alive on all sides of the trunk, and the branches and sprouts thrown out are more firmly united with the trunk than any others. I would cut down close to the ground every tree less than six years set and draw the dirt away from the collar, so as to expose the surface roots slightly to the sun. As soon as possible I should plow the grove and break as many of the roots as possible, and have a man with a keen grub-hoe following to cut off smoothly the ends of all such roots. I would advise those having small groves to dig a trench ten inches deep, grading the distance from the trunk according to the size of the tree and cutting off all the roots. A few trees treated in this way a year after the cold weather show a marked improvement in growth during the second summer. As soon as the sprouts from the ground are large enough insert the buds or get them started as soon as possible. If this is delayed until the next spring the buds will make too rank a growth. If the ground is in fairly good condition I would apply no fertilizers for two or three years at least. In a young grove where the trees were cut to the ground I would cultivate it and keep it clean, while in older groves, after the first plowing, a circle hoed around the trees will answer every purpose. There is a diversity of opinion as to the number of buds that it is necessary to let grow, and it

will take the experience of years to decide which plan is the best. In my younger trees, where the stump will probably heal over, I have let only one grow, as I much prefer a single trunk. In the case of old trees killed to the ground it will be a temporary makeshift at the best to get a few oranges while the newly set tree is growing, so that it makes but little difference whether two or half a dozen are grown. I am taking advantage of this opportunity to change varieties to the fullest extent, discarding all those that have not proved the best for this locality. I have rebudded all my Navels; have discarded most of the Maltese and imported varieties generally; have reduced the number of Tangerines one-half and added largely to the number of Grape-fruit grafts. I have budded almost exclusively with our best home varieties, adding a limited number of Boones and Parson Browns for early, and Hart's Tardiff and Valencia for late varieties. Nearly every grower has one or more trees in his grove which bear a superior quality of fruit, and from these trees he should take his buds. Indian River oranges have a special quotation in the market, and it is necessary for the reputation of this locality, as well as for individual success, to keep the quality of fruit up to the standard and improve it at every opportunity.

Conifers on the Grounds of the Kansas Agricultural College.—III.

THE RED CEDAR, EUROPEAN LARCH AND OTHERS.

THE Red Cedar, *Juniperus Virginiana*, has been quite extensively planted, probably next to the Scotch and Austrian Pines in point of numbers, and in general its growth has been very satisfactory. This might have been expected since it is a native of this region. The principal objection to it has been the extent to which it was infested with *Gymnosporangium macropus*. The trees become covered with the brown knots due to this fungus, and after a rain in the spring or early summer are fairly yellow with the gelatinous spore-masses. Before 1895 some desultory attempts were made to pick off these balls, but with no very satisfactory results. In that year, however, a group of Cedars was selected and all of the balls which appeared, even down to the size of a pea, were carefully removed. The result was so encouraging that the practice has been extended to most of the trees on the grounds, with the result that the fungus has been greatly reduced. It is hoped that by continuing this practice systematically for a number of years they may be practically freed from it. Eight Cedar-trees planted in 1872 on the lower part of the farm, where the soil is deep and rich, now average as follows: Height, 31½ feet; diameter at the ground, 13 inches; at 2 feet, 11 inches, and at 6 feet, 9 inches. In 1888 these trees averaged 11½ inches in diameter at the ground, and 8 inches at 6 feet. Thirty-five trees set in groups about the lawns in 1884, and then about 4 feet in height, now average 18¾ feet in height, 8½ inches in diameter at the ground, 6½ inches at 2 feet, and 4¼ inches at 6 feet. Another group of forty-seven trees set in the spring of 1888 at three years old now average 9 feet in height, 3 inches in diameter at the ground, 2¼ inches at 1 foot, and 1¾ inches at 2 feet. The soil is here a clay loam of about ten inches in depth, underlaid by a rather friable red clay subsoil.

The European Larch has not been extensively planted here, but three rows of them stand at the extreme eastern edge of the college premises, where the soil is very deep. They were set in the spring of 1888, and when bought were some sixteen inches in height, but at setting they were cut back nearly to the ground. For the first three years they made comparatively little growth in height, but sent out long side branches, spreading about irregularly over the ground. In the spring of 1892, however, they began to send up strong leaders, and since then they have increased rapidly in height. The three rows above mentioned, some thirty odd trees, now average 16 feet in height, 5½ inches in diameter at the ground, and 3 inches at 6 feet. They seem perfectly hardy and are certainly worthy of more extended trial.

Among other conifers which have been tried in limited numbers, the following deserve mention: The Bald Cypress,

Taxodium distichum, is represented by a single old tree set in the spring of 1873, and a number of younger ones set in 1884. They cannot be recommended for general planting, as many of the younger trees have died, and there seems to be a decided tendency for the leader to die, and thus destroy the beauty of the tree, but in some locations they have done well. In 1888 the old tree measured 23 feet in height, 16 inches in diameter at the ground, and 9 inches at 6 feet high. It now measures 24½ feet in height (the leader having died since 1888), 20¼ inches in diameter at the ground, and 12 inches at 6 feet.

The Ginkgo-tree is fairly hardy when grown in sheltered situations, and, although very slow of growth, it is well worth planting where a tree of peculiar habit is desired. A specimen near the college greenhouse, set in 1884, now measures 11 feet in height, 4½ inches in diameter at the ground, and 3 inches at 2 feet.

The Colorado Silver Fir, *Abies concolor*, and the Siberian Fir, *A. Sibirica*, are apparently quite hardy in favorable locations, but so slow of growth as to be valuable only for ornamental planting.

A number of *Arbor Vitæ* have been tested, but only two are worthy of mention, and these should be planted sparingly and only in favorable, sheltered locations. They are *Thuya occidentalis*, the American *Arbor Vitæ*, and the Siberian, *T. Sibirica*, really a form of the American species. *Agricultural College, Manhattan, Kan.*

F. C. Sears.

Foreign Correspondence.

New Garden Plants, 1891-1895.

INSTEAD of reviewing the new plants of the year just ended, I propose to devote this letter to a review of the best of the plants introduced during the five years from 1891 to 1895, inclusive. Plants that promise well when first obtained often turn out failures on further acquaintance, and only a small percentage of the plants that are introduced as likely to prove useful in the garden really do so. This may be due to numerous causes, the three principal of which are want of attractiveness, difficulty of cultivation and slowness of increase. Many Orchids fall under the third category, especially those of hybrid origin. Thus hybrid *Cattleyas* raised twenty years ago are still rare. On the other hand, a few of the quick-growing hybrids, such as *Calanthe Veitchii*, *Cypripedium Leeanum*, *Phajus Cooksoni*, *Disa Veitchii* and *D. Kewensis*, are now so abundant as to be available for all collections.

According to the lists of new plants prepared each year at Kew and published as an appendix to the *Kew Bulletin*, the average number of new introductions is about 400 per annum. For five years this makes a total of 2,000. I have been through the whole of these, and noted all those plants that may now be considered established garden favorites, or on the way to becoming such. These are enumerated below. It is possible that some of those excluded will by some be considered as worthy as some of those enumerated, but, so far as I can judge from experience and observation, the selection here made is not far from the mark.

ORCHIDS.—For obvious reasons hybrids of garden origin are excluded. They are, as a rule, represented by only one or two examples, the exceptions being the hybrid *Disas*. Among tropical Orchids I find only *Cypripedium Charlesworthii*, a first-rate garden Orchid in every sense. *C. Exul* also deserves mention, but I question if *C. Chamberlainii* does. It is a remarkable Orchid, lacking, however, in those qualities required by the ordinary cultivator. *Cochlidia Noetzeliana* is a good second-rate Orchid for the cool house. *Catasetum splendens*, in all its numerous varieties, is a rich addition to the garden representatives of this singular genus. *Dendrobium Hildebrandii* grows freely and flowers profusely, but its flowers lack the charm of color, and I doubt if it will be accepted as a garden Orchid. *Eulophiella Elizabethæ* is a beautiful Orchid when properly grown, but I hear it is a failure in many collections, and this will

prevent its becoming a favorite. *Habenaria carnea* is distinct and pretty in color, and is easily grown. *Lælia tenebrosa* is the pick of the introductions among Cattleoid Orchids, and *L. Lucasiana* also deserves mention, although it has not proved a free bloomer so far. *Oncidium dichro-mum* improves on acquaintance, but it belied its description when first it flowered. *Renanthera lmschootiana* is a beautiful Orchid, and if only it prove a free flowerer it will become one of the most popular of the East Indian introductions.

STOVE PLANTS.—There are about a score of these to be added to what we possessed previous to 1891. They are *Aristolochia Gigas Sturtevantii*, *Allamanda Williamsii*, *Begonia decora*, *B. Rex* × *Socotrana*, *B. Gloire de Lorraine*, *B. President Carnot* and *B. Rajah*. These are all really excellent plants which I have seen in superb condition recently. *Bougainvillea glabra Sanderiana* is the freest-flowering of all *Bougainvilleas*. *Dracæna Godseffiana* and *Sanderiana* are valuable additions to ornamental-leaved stove plants. *Dermatobotrys Saundersæ* is a pretty winter-flowering pot shrub which is certain to find many admirers. It has smooth brown stems and numerous clusters of tubular salmon-red flowers, produced while the plants are leafless. It was introduced from east Africa to Kew a few years ago. *Heliconia illustris* and its variety *splendens* are brilliantly colored plants which pay for liberal treatment and a high temperature. *Impatiens auricomma* makes a shrub a yard high and flowers very freely when planted out in a border. *Nepenthes mixta* is the best of the hybrid *Nepenthes* raised by Messrs. Veitch, or, at any rate, it is as good as their grand hybrid *N. Mastersiana*. *Maranta Sanderiana* is a tall handsome plant with richly colored purplish leaves. *Ptychoraphis augusta* and *Thrinax Morrisii* are two of the most distinct and elegant of Palms introduced within the last twenty years.

COOL-HOUSE PLANTS.—There are very few additions in this department. The best are the two yellow *Richardias*, *Elliottiana* and *Pentlandii*. *Alberta magna* is still on trial. I saw a beautiful example of it in flower in the Glasgow Botanic Gardens a few weeks ago. It will probably prove most satisfactory when grown as a shrub in the open air in places where it will be hardy. *Crotolaria longirostrata* is a pretty winter-flowering species which is grown in pots at Kew. *Incarvillea Delavayi* is not satisfactory as a pot-plant, but I hear it is beautiful in some gardens in the open air. *Primula imperialis* will always find friends on account of its gigantic proportions and its interesting character. Only three Ferns deserve mention; they are the hybrid *Polypodium Schneiderianum*, *Pteris longifolia Mariesii* and *Alsophila atrovirens*.

HARDY HERBACEOUS PLANTS.—There are many of these recorded as new and interesting, but very few of them have found favor. *Calceolaria alba* is a charming perennial of special interest to the breeder. *Chrysanthemum Nipponicum* is a hardy perennial two feet high, but as it flowers at the end of the year it requires to be lifted in the autumn, or it should be grown in pots along with the common *Chrysanthemums* and treated the same. It produces beautiful Marguerite-like flowers three inches across. *Cineraria maritima aurea variegata* is a prettily variegated plant, useful either for bedding or for pot cultivation. *Dianthus callizonus* is a charming little species with large flowers and is a perfect rockery plant. *Hemerocallis aurantiaca major* is the largest and best of the day Lilies. *Iris Sari*, *Lilium chloraster*, *L. leucanthum* and *L. Lowii* and *Kniphofia Nelsoni* are worthy border plants. *Nemesia strumosa* is better when grown in pots in a frame than as an open-air annual. Marliac's new hybrid *Nymphæas* are only prevented from becoming as common as our white *Nymphæas* by their slowness of increase and consequent high cost. *Physalis Franchetii* is as easily grown and fruits as freely as *P. Alkekengi*, its fruits being three times as large. *Senecio sagittifolius* will find favor where it can be grown permanently out-of-doors. *Tulipa Billietiana* is a handsome and distinct addition to the Tulips of the Ges-

neriana class. I have omitted *Calochorti* only because the difficulty experienced in their cultivation here has so far proved a barrier to their becoming popular.

TREES AND SHRUBS.—Very few good things are recorded among these, but what there are stand out prominently. We have nothing better in the garden than *Spiræa Bumalda* Anthony Waterer, and no more beautiful white-flowered small shrub than the hybrid *Deutzia Lemoinei*. *Betula Maximowiczii*, for which we are indebted to Professor Sargent, who introduced it from Japan, is a distinct and striking addition to the Birches. *Vitis Coignetiae* is now in every good garden.

London.

W. Watson.

New or Little-known Plants.

Pseudotsuga macrocarpa.

THIS tree is, perhaps, the most characteristic feature of the scanty forests which clothe the western and southern slopes of the mountains which, extending in the arc of a circle from Ventura County, California, to the southern borders of the state and forming nearly a continuous range, are known as the Saint Emilio, the Sierra Pelona, the Sierra Madre, the San Gabriel, the San Bernardino, the San Jacinto and the Cuamaca Mountains. The rainfall on these mountains is small and unequally distributed through the year; and the forests below elevations of five thousand feet are poor and scanty, and are composed of Junipers, *Pinus attenuata*, *Pinus Coulteri*, occasionally descending from the higher altitudes, where it is more at home, *Pinus ponderosa*, *Quercus Wislizeni*, *Quercus chrysolepis* and the large-coned *Pseudotsuga*, which, so far as is now known, is confined to these mountains. It is common here above the banks of streams and on the steep slopes of narrow ravines between three thousand and five thousand feet elevation, and is able occasionally to maintain a foothold on the drier ridges above, although it does not form continuous groves unless aided by the moisture held in depressions in the mountain-sides, which become torrents at certain seasons of the year. In such favorable positions the large-coned *Pseudotsuga* occasionally attains the height of eighty feet, with a stout trunk sometimes three or four feet in diameter, although trees of this size are exceptional, and this species rarely grows to a greater height than forty or fifty feet. It is a distinct tree, with long, somewhat pendulous and remarkably remote branches which form a broad, open, pyramidal head, foliage of a peculiar blue-gray color, and cones six or eight inches in length. The illustration on page 25 of this issue, made from a photograph taken in winter of a part of the outer wall of the Sierra Madre Range, now in the San Gabriel Reservation, shows the habit of this tree and the manner in which it spreads up the sides of ravines. For the opportunity to use this photograph we are indebted to the courtesy of Mr. Abbot Kinney, of Los Angeles, California, who has sent us an interesting collection of views taken in the reservation.

Pseudotsuga macrocarpa, discovered in 1858 on the mountains near the San Felipe by Lieutenant Ives's Exploring Expedition, was first described by Dr. Torrey in 1860 in Ives's "Report on the Colorado River in the West" as *Abies Douglasii*, var. *macrocarpa*. It has usually been considered a variety of the Douglas Spruce, but Mr. Lemmon has considered it specifically distinct, and his opinion appears to be well taken. From the Douglas Spruce it differs in its proportionately longer and more remote branches, in its shorter and stouter winter-buds, and in its shorter blue-gray, somewhat twisted and sharply pointed leaves, those of the Douglas Spruce being obtuse. The cones are from six to eight inches long, or fully twice as long as the largest cones of the other species, but the bracts are proportionately shorter. These characters are constant, and I have not been able to find a tree which appears intermediate in character between the two species, which, so far as I know, do not grow together on the same mountain ranges.

Pseudotsuga taxifolia does not extend south on the Sierras below the head of King's River, or to within a hundred miles from the territory occupied by *Pseudotsuga macrocarpa*, and it does not cross the Colorado Desert from the east. If the two trees do grow together it is on the mountains of Ventura or Santa Barbara counties, the southern limits of the range of *Pseudotsuga taxifolia* in the California coast ranges being undetermined.

Pseudotsuga macrocarpa is, I believe, still unknown in cultivation. It will probably never be valuable for its timber, but in hot, dry countries like southern California or those bordering the Mediterranean it may prove an interesting and attractive inhabitant of ornamental plantations.

C. S. S.

Alphas just as soon as the ground could be worked in the spring, and ten days later I have planted on the same day Alpha, Premium Gem, McLean's Advancer and Champion of England. These would follow each other in ripening, so that by planting three or four more successions of Champion of England a week apart I would have peas from early in June until the mildew ruined them. Unfortunately, Alpha has become so mixed and degenerated that it can be no longer trusted, but experience with Nott's Excelsior shows that it will be fit for the table about as soon. It is a very dwarf grower, being hardly more than a foot high, and it bears abundantly pods which are tightly filled with peas of the best flavor. McLean's Advancer, an old variety, still holds good for second early. Stratagem, Telephone, Heroine and Admiral have become popular varieties, but a well-selected strain of Champions I still find the most trustworthy. The climbing varieties should



Fig. 5.—*Pseudotsuga macrocarpa* on the San Gabriel Forest Reservation.—See page 24.

Cultural Department.

Vegetable Notes.

Peas.—These are among the most delightful products of the garden, but since they lose their flavor very quickly after having been picked, none of the early offerings from southern fields can compare with those grown at home. The first dish of peas is, therefore, one of the events of the season, and it was only a few years ago when any gardener in this latitude was considered enterprising if he had green peas with his roast lamb on the 4th of July. Varieties have been produced, however, in recent years which will ripen here early in June, and these, too, of the wrinkled kinds, which are alone fit to plant for home use, since the hard, round, bullet peas are altogether inferior in quality, from lack of sugar and other elements. The difference between Sweet corn and ordinary Field corn is not greater than that between the wrinkled peas and the round peas. For many years I have planted a row of

have brush or netted wire before they fall down. Deep planting, rich, moist soil and clean culture are the essentials of success. After the Peas have well started, a good mulching helps them materially.

Beans.—Of Bush Beans, those with round pods, whether they are light-colored or green, are usually the most tender and best-flavored. Different varieties of the Black Wax, Kidney Wax, Refugee and Valentine make compact plants without any runners, having full pods that are slow to become stringy. A year ago this journal contained some notes on the cultivation of garden Beans by Professor Tracy, which have proved of great value to me, as they laid down principles which furnish the reasons for cultural practice. Although these plants grow rapidly when well fed and in the proper kind of soil, yet they are quickly discouraged by any untoward happening or any injury, especially to their roots—that is, the plant, owing to its lack of recuperative power, will be killed or, at least, stunted by any such injury to the root as would make a Lettuce plant or Corn plant grow all the faster. Standing water

about the roots is also fatal, so that a well-drained soil is essential. This lack of ability to recover from any such check means that the main crop should not be planted until the danger of a chill is over, although a few hardy sorts like the Black-eyed Wax may be planted rather early. To avoid injuring the plant and its roots, the soil ought to be made very fine by deep spading, with well-rotted manure thoroughly mixed in when necessary. A dressing of bone-dust and ashes before the crop is planted is also desirable, since the Bean plant needs potash and phosphoric acid more than it needs nitrogen. The ground should be cultivated deeply and thoroughly two or three times before the seed is planted, but after the leaves appear nothing should be done except to cut down the weeds by hoeing on the surface without disturbing the roots. The same principles should be observed in cultivating the climbing varieties—that is, deep and thorough fining of the soil before the seed is sown, and then avoidance of tramping or digging about the roots beyond what is absolutely necessary.

Peppers and Eggplants.—Another suggestion of Professor Tracy's which has been very useful to me is that we should remember in caring for Eggplants, Peppers and Tomatoes, that they are annuals that have developed in tropical latitudes. In their native home they grow steadily from the time the seed germinates until the fruit ripens, and it this habit is interfered with the plants are sure to resent it. Plants like Peas which have their home in cold latitudes can remain stationary for a long time under discouraging conditions, and as soon as these are removed they will at once start into growth with increased vigor; but this is not true of these tropical plants, and therefore nothing is gained by sowing the seed until there is just time enough for them to reach the proper size for handling and transplanting when the ground has become permanently warm. If they are forced along before this and then held back by cold weather they will spindle into a soft growth and never yield a full crop.

Tomatoes.—This vegetable comes from tropical America, and it requires from 150 to 200 warm days to produce its fruit. A temperature of at least seventy degrees, Fahrenheit, is needed during the growing season of the plant, and Professor Tracy tells us that ten degrees higher than this, both in the soil and air, is required for the best maturing of the fruit. In our northern states this high temperature is only reached during August and early September, and the proper temperature for growth does not begin until the first of June, so that the season must be extended artificially by starting young plants under glass. Here the same law holds that has been alluded to in the case of Peppers and Eggplants. Nothing will be gained by sowing the seed so early that the plants become drawn and spindling, for they will suffer a material check when they are set out. In its native habitat for three or four months the plant grows every day and accumulates enough energy to produce its fruit, and then it dies from exhaustion. If we want a crop of tomatoes in late July or the first of August nothing will be gained by sowing the seed before the 10th of April, because if we give the seedlings the proper light and air and heat to keep them growing strongly, they will be large enough to transplant as early as the soil and air outside are warm enough to receive them without giving them any check. If the seed is sown on the first of March the plants would be of full size by the time it was proper to transplant them. If they have grown so slowly that at the end of these ninety days they are only large enough to set out, this means that they have not acquired that momentum of growth which is necessary to produce the best crop. Of course, there are various methods of transplanting which will forestall any wilting or check from this process, but for ordinary cultivation the seedlings may be put into small pots, shifted on as fast as possible, and while they are growing the ground which is to receive them should be well fertilized and made fine by frequent and deep cultivation, so that the plants may be set out in a warm open soil that has already been cultivated thoroughly and deeply. It is much easier and much better, from every point of view, to do this work before the plants are set out.

Onions.—Of course, the so-called new culture is the best. Seed can be sown either in the greenhouse or in a hot-bed about the middle of February, and the seedlings should be transplanted into flats and then hardened off in cold frames. Half an ounce of seed will make enough to plant a large area, enough, indeed, for an ordinary sized family. After the ground has been thoroughly worked in the spring the small bulbs should be set in rows eighteen inches apart, and six inches apart in the row. This crop is very troublesome to keep clean when the seed is sown in drills where it is to grow, but when treated in the way recommended the ground can be thoroughly

cleaned before the young bulbs are transplanted and the labor will be materially lessened. Varieties of a mild flavor are desirable. Prizetaker is one of this kind. It is of good shape, and is also valuable for its long-keeping quality.

Montclair, N. J.

J. A. Newlin.

India Rubber Plants.

THE India Rubber plant, *Ficus elastica*, is the most satisfactory tropical plant in general cultivation, as it can be grown by everybody successfully, or, to put it more exactly, it is very tenacious of life, and in all positions in the dwelling, greenhouse or conservatory it flourishes with little attention. It revels in abundance of water, yet a temporary dryness distresses it little. Sometimes a fall of temperature will cause it to drop its leaves, making the plants rather unsightly. Judging from the number of leggy and bare plants seen in living-rooms, as well as in greenhouses, it does not seem to be generally known that the production of lateral shoots, or new branches, and bushy specimens is the simplest of horticultural operations. Unless an India Rubber plant is bare in places a single-stemmed specimen, up to five or six feet, is usually the most satisfactory. For larger specimens, or when plants are denuded of leaves, branches are most to be desired. To produce these it is usually recommended to pinch out the leading shoot. This will cause branching, but the new growths are not apt to break where they are wanted most, and, besides this, the loss of the leader spoils the plant as a specimen. The simpler practice is to score the main axis where new growths are desired. By making an incision across the stem with a thick-bladed knife through the bark and slightly into the hard wood, a flow of sap will ensue. This will soon be followed by a callous, and from the edge of this a bud will usually be found in a few weeks. This is simply an exemplification of the well-known fact that buds may be formed from any part of a plant body, and we are all familiar with their occurrence, especially on the stems and roots of hardwood plants. They are more apt to occur near callosities, the result of injuries, or near the axis of a leaf, where food is naturally most abundant. It will usually be most satisfactory to score the India Rubber plant above a leaf scar, and a large proportion of the cuts will prove effective. My observation seems to show that the new buds progress the most rapidly on the part of the stem best lighted, and that the growths are made as rapidly under ordinary house culture as in the greenhouse.

Every one is familiar with the usual practice of shortening India Rubber plants by wrapping sphagnum around the stems where roots are desired. By keeping the sphagnum moist, roots are soon emitted, and the upper shoot may be taken off and planted. They are also propagated in the greenhouse by using single leaves with a portion of the stem, plunging them in sand and keeping at a high temperature. It seems strange that a score kept dry will insure a bud, but if wrapped in a moist medium will produce roots. A ready way to shorten these plants in summer is to bank the earth up the stems, and use the new roots formed instead of the old ones. In this era of rubber-tired wheels, India rubber has become commercially of increasing importance, and the demand for the higher grade of the product is especially urgent, as the lower qualities quickly disintegrate after soft vulcanization. I am told by experts that there is no certain test of the commercial gum, though fine dry "upland" Para gum usually produces good results, yet the industry is always subject to uncertainty from our lack of knowledge of the constitution of this substance. I know of one concern which lost a fortune and its reputation for certain finished goods, which it had maintained for a number of years, because they had unwittingly bought gum from some section where the juice had a different structure, rendering it unfit for vulcanization, yet in appearance and working no expert could determine the difference. We progress rather faster in philosophical deductions than plant-knowledge.

Elizabeth, N. J.

J. N. Gerard.

Seasonable Work.

AS the days lengthen, signs of growth will be seen among various plants that have been more or less dormant for some months past, and this means that the time for repotting, dividing and propagating is at hand. Caladiums and Alocasias, after their needed winter rest, are about to start, although the foliage of Alocasias does not die off entirely from some of the species, as it does with Caladiums when they rest. To economize space, many growers shake out Caladium-bulbs in the fall and store them in pans or boxes of sand under the stage

in a warm house, and give them water enough to prevent dry rot during winter. But as soon as the eyes show signs of starting, the roots should be brought out into the light and divided with a sharp knife, and the cut surfaces dipped into slaked lime to prevent decay. Water should be given sparingly until some new roots are made, when the young plants should be set in small pots, using a rather sandy, but rich, compost. They require a warm and moist atmosphere, and should be repotted before the plants become at all stunted. *Alocasia Jenningsii* and *A. Marshallii*, species of moderate growth, are deciduous, and thrive under the treatment suitable for *Caladiums*, but some of the stronger *Alocacias*, like *A. Sedenii*, *A. metallica*, *A. Veitchii*, *A. macrorrhiza* and *A. zebrina*, usually retain some of their foliage, and naturally require more water. They also need more drainage in the pots or pans and a very open compost. When starting into growth again both *Caladiums* and *Alocacias* are very likely to throw up flower-stems, and these should at once be removed, as they tend to weaken the foliage.

The seeds of *Gloxinias*, being very fine, should be sown on the surface of the soil, as Fern-spores are. A safe soil is composed of peat, loam and sand in about equal parts, with some chopped sphagnum mixed through it to keep it more open. *Gloxinia*-seeds should be placed in a warm and moist atmosphere, and should be covered with a sheet of paper until they germinate. This prevents the soil from drying out rapidly, and does away with the need of much watering until the seedlings are visible. Care is needed in handling the young plants, but they are worth the attention.

With stronger sunshine Easter Lilies and the various spring-flowering bulbs will make rapid growth, and a few of the latter should be brought into heat at short intervals for a succession of flowers. With the exception of *Lily-of-the-valley*, a good root-growth is essential before these plants have strong fire-heat, otherwise the flower-stems will be weak and small. Aphides will be sure to find the flower-buds of *Lilium longiflorum*, and are best removed by an occasional dipping in weak tobacco water, a more cleanly remedy than dusting with snuff or powdered tobacco. *Cinerarias*, too, are specially subject to this pest and will require close watching now if the foliage is to be saved. These plants will also need plenty of fresh air to prevent a spindly growth, and as the flower-spikes appear some extra feeding with liquid-manure will be of great benefit.

New Holland plants, such as *Ericas*, *Epacris*, *Eriostemons*, *Boronias*, *Darwinias* and a host of others, are not only notably pretty in form and color, but also fragrant and lasting in bloom. Some of them demand a little extra attention during our hot and dry summers, yet they fully repay the trouble, and a strong point in their favor is the fact that little fire-heat is needed to carry them through the winter. It is a misfortune that they are not more generally grown. The repotting of Palms and many foliage plants had better be deferred for a few weeks, as but little growth will be gained, with the Palms in particular, by shifting them before the roots are making a decided move, and in some instances they will receive a positive check. Special care in firing is needed now, for when the temperature ranges high at night Palms are likely to be excited before their time and thus become weakened. For the species in general use a night temperature of sixty to sixty-five degrees is quite sufficient.

Holmesburg, Pa.

W. H. Taplin.

Anthuriums.

FLOWERS of brilliant color and odd shapes, as well as rich foliage in many cases, give these tropical plants a distinction not only for decorative purposes, but for use in the conservatory with other plants. Nearly all the species do best in a temperature of from sixty-five to seventy-five degrees, which should be kept as nearly even as possible. During warm sunny days the plants need shading, since their native habitat is along the banks of streams and in dense swamps which the sun's rays hardly penetrate. Good potting material is leaf-mold, rotted sod, sand and fine charcoal; they also thrive in well-mixed peat and sphagnum, but when this is used the drainage should be carefully looked after, and they should be potted very firmly. This is a good time to propagate. Small varieties should be divided so as to leave a crown to each plant, while the tops can be cut from the taller ones with a few roots attached, and the old plants will break very readily from below. The raising of seedlings is a slow process, some varieties needing to be fertilized by hand and requiring a year for ripening the seed. The seeds should be sown as soon as they ripen in shallow pans on chopped peat and fresh sphagnum, where they will germinate in seven or eight weeks if placed in

a close frame or under a hand-glass with a bottom-heat of about eighty degrees. As soon as they have formed two leaves they should be transplanted into small pots.

Of the varieties one of the most showy is *Anthurium Andreanum*, which bears all the year round large scarlet flowers which retain their beauty for months together. It is one of the very easiest to grow, and although usually planted in pots we have found that it does admirably in beds. A bed of peat and sphagnum twenty-five feet long and four feet wide was a wonderful spectacle four months after it was filled with these plants. Wherever one has room to spare this certainly proves in the end the most successful way to produce flowers, as we have proved by cutting hundreds of them from this bed every year, some of the spathes measuring more than eight inches long. *A. Scherzerianum* does better in pots. Since its roots are not as long, the plants should be set more deeply, so that the new roots will penetrate through the peat and sphagnum. *A. Rothschildianum* bears very profusely bright scarlet spathes mottled with white. *A. Bennetii* is distinguished by its long and sharply tapering spathe. *A. giganteum* is distinguished for the great size of its flowers, and *A. maximum* produces spathes from seven to nine inches long, four inches wide, and of the most intense scarlet. Among the varieties with decorative leaves are *A. crystallinum*, with leaf-veins of crystal white; *A. triumphans*, with long bright green leaves and prominent ribs of a lighter color; *A. Veitchii*, often called the Elephant's Ear, with leaves from two to three feet long and of a metallic hue; *A. Waroquensis*, with large, striking, rich green leaves of a velvety lustre and paler midribs and veins.

Tarrytown, N. Y.

William Magee, Jr.

Window Plants.—At this season house-plants in bloom are grateful for an occasional feeding with liquid fertilizer, which gives the leaves a deeper green and increases the number and size of the flowers. Any perfect commercial plant-food can be used in solution, but cow-manure is quite as satisfactory, especially if a little ashes can be mixed with it for extra potash and the ingredients steeped in a barrel of water for several days. This liquid should then be diluted until it has the color of weak tea, for if applied too strong or too freely it is sure to injure the plants. At first the solution should not be given oftener than once a fortnight, but it can be gradually increased in frequency until it is used as often as once a week or once in five days.

Lafayette, Ind.

William Stuart.

Correspondence.

The Best Winter Pears.

To the Editor of GARDEN AND FOREST:

Sir,—We have varieties of pears in abundance which are suitable for use between the middle of July and the middle of December, a period of five months, but it is greatly to be desired that this period should be doubled in length. The really good varieties which are available for use in winter and spring are few. The Anjou, which bears so well and regularly, I cannot keep after New Year's. Winter Nelis, which is richer in flavor, can be kept until February with very careful handling. Josephine de Malines is not as rich in flavor, and with me it has a marked astringency, although its keeping qualities are so good that it will last till late March. Easter Beurre is of first-rate quality, never ripening with me before March and keeping till April, but it has a serious defect of ripening unevenly. When the side of well-grown specimens exposed to the sun on the tree is in its best form for the table, the shaded side is often so hard that it cannot be eaten. Among the recently introduced late-keeping varieties I have made a fair test of Duhamel de Monceau, Colonel Wilder and P. Barry. Duhamel de Monceau is a fair substitute for Winter Nelis, is larger and handsomer, and is not attacked by any of the fungi to which the Nelis is showing an increasing and discouraging susceptibility. It is juicy and melting, rather than sweet, and not quite equal to Winter Nelis in quality, but still very good. It is not so even a bearer. Colonel Wilder is large, handsome, and, although it is a good pear, its quality is inferior to that of Duhamel de Monceau. P. Barry is also large and handsome; in quality equal to the best of the pears, and it is a great keeper. Its season of ripening extends through April. The tree with me, however, is a slow grower and always inclines to overbear. I have grafted it upon different standard stocks, such as Flemish Beauty, Clapp's Favorite and White Doyenne, on the last of which it has made its best growth. Some of your readers will render a real service to those of us who are experimenting in this direction with the later-keeping pears if

they would give an account through the columns of GARDEN AND FOREST of their personal experience.

Amherst College, Mass.

A. D. Morse.

Recent Publications.

The First Account of Some Western Trees.*—I.

Lewis and Clark, in their expedition across the continent from the mouth of the Missouri River to that of the Columbia on the Pacific coast during the years 1804-1806, were the first white men to cross the Rocky Mountains within the present territory of the United States, and their geographical and natural history observations are therefore of peculiar interest. The value of the journals of these two great explorers, first edited by Nicholas Biddle, is moreover now greatly increased by the learned notes with which Dr. Coues has enriched a new edition of this classical work. Lewis and Clark were the discoverers of many interesting and important trees, and it is solely with reference to the trees mentioned in their journals that we now propose to examine this new edition.

Following their journey we find (i., 63) that when the party had reached a point 690 miles above the mouth of the Missouri, on the 30th of July, 1804, the Lynn, among other trees, was noticed. This is referred by Dr. Coues to *Tilia pubescens*, a species, however, confined exclusively to the coast region of the south Atlantic states; and it is evident that the Linden of the Missouri bottoms was *Tilia Americana*, our common northern species. On the 16th of September (i., 119), not far from the confluence of the White River with the Missouri, the party was encamped "in a beautiful plain, with timber thinly scattered for three-quarters of a mile and consisting chiefly of Elm, Cottonwood and some Ash of indifferent quality, and a considerable quantity of a small species of White Oak." This last Dr. Coues refers to *Quercus undulata*, var. *Wrightii*. More probably, however, the Oak seen here was *Quercus macrocarpa*, which extends farther to the north-west than any of our Atlantic species; and this determination seems to be confirmed by the description of the cup of the acorn "which is fringed on the edges and embraces it about one-half." *Quercus undulata* and *Quercus Gambellii*, the two Rocky Mountain White Oaks, which are often confounded in some of their forms, are not known east of the continental divide north of the Platte River in Colorado. On October 2d the party fell in with a Mr. Valle, a French trader, who had visited the Black Hills, which he described to them as covered with great quantities of Pine (i., 150). This is *Pinus ponderosa*, and probably the first authentic allusion in literature to this widely distributed tree, which was not described technically until the appearance of Loudon's *Arboretum* in 1838. Sergeant Gass, in ascending White River on September 15th (i., 117), had seen, however, Pine burrs and sticks of Birch floating down the river. These Pine burrs must, of course, have been the cones of *Pinus ponderosa* from the pineries of north-western Nebraska.

On April 12th of the following year (i., 268), after the winter passed near the Mandan villages, a species of dwarf Cedar which "spreads its limbs along the surface of the earth, which is almost concealed by its closeness and thickness and is sometimes covered by it, was noticed above the mouth of the Little Missouri." Judging by the description of its leaf, which "is more delicate than that of the common Cedar, though the taste and smell are the same," it is, no doubt, rightly referred by Dr. Coues to *Juniperus Sabina*, var. *procumbens*, which ranges westward to the eastern foot-hills of the northern Rocky Mountains.

The Ash-tree seen on April 20th (i., 277), near what is now the eastern borders of Montana, must certainly have been the Green Ash, *Fraxinus Pennsylvanica*, var. *lanceolata*, as doubtfully determined by Dr. Coues; and in the same paragraph there is a reference to Service-

berries, being the first appearance in literature of the western species of *Amelanchier*, described many years afterward by Nuttall as *Amelanchier alnifolia*, unless, as we suspect, the berries, "which my people called poires, and were of a purple hue, somewhat bigger than a pea, and of a luscious taste," found by Alexander Mackenzie in August, 1789, to the north of Slave Lake, were derived from this *Amelanchier* (*Voyages*, 107). Under the entry of Wednesday, July 17th, 1805 (ii., 419), the western *Amelanchier* is shown to differ in some points from that of the United States; "the bushes," we are told, "are small, sometimes not more than two feet high, and rarely exceeding eight inches. They are proportionally small in their stems, growing very thickly, associated in clumps. The fruit is of the same form, but for the most part larger and of a very dark purple."

On the 11th of May (i., 306), being in Montana, the party saw and visited "some high hills on the north side, about three miles from the river, whose tops were covered with a Pitch Pine. This is the first Pine we have seen on the Missouri; it is like that of Virginia (which Dr. Coues calls *Pinus rigida*), except that the leaves are somewhat longer." This new Pine was *Pinus ponderosa*; and on May 21st (i., 318) the country was found "broken and crowned with some Pine and dwarf Cedar; the leaf of the Pine is longer than that of the common Pitch or Red Pine of Virginia; the cone is longer and narrower, the imbrications are wider and thicker, and the whole is frequently covered with rosin," a good description of *Pinus ponderosa*.

On the Teton River (ii., 356) Captain Clark first noticed a "species of Cottonwood with a leaf like that of a Wild Cherry." This, as Dr. Coues points out, is the narrow-leaved Cottonwood of the Rocky Mountain region, *Populus angustifolia*, here first noticed, although it was not technically described until 1823, after its discovery in the southern Rocky Mountains by Long's expedition to Colorado. It was well described, however, by Lewis and Clark (ii., 364) in their entry of June 12th, when they found it mixed with the broad-leaved Cottonwood, which up to this time had formed the principal timber which they had seen on the banks of the Missouri River.

On July 10th, being in the basin of the Dearborn River and ascending the eastern slopes of the Rocky Mountains, the travelers found (ii., 424) that "the Pine-trees had been stripped of their bark about the same season, which our Indian woman says her countrymen do in order to obtain the sap and the soft parts of the wood and bark for food." This Pine-tree is probably *Pinus ponderosa*, as it is the bark of this species which was most generally eaten in time of famine by the Indians of the west. On the same day were seen on the mountains (ii., 425) "little copes of Pine, Cedar and Balsam Fir." The Balsam Fir is rightly referred to *Abies subalpina* or *lasiocarpa* by Dr. Coues. This is the first mention of the alpine Balsam Fir of the interior north-western region of the continent, with a range extending from Alaska to the Cascade Mountains in southern Oregon, Colorado and northern Arizona, unless this species was one of the Balsams noticed by Mackenzie some years earlier in British Columbia.

On August 3d, the party now being on the Jefferson River, a small species of Birch (ii., 457) was noticed among the shrubs bordering the stream, and described as having "a finely indented oval leaf of small size and deep green color; the stem is simple, ascending and branching, and seldom rises higher than the ten or twelve feet." This is the first account of *Betula occidentalis*, although the western Birch was not described technically until 1839. The mountains at this place are described as "high on each side of the valley, but their only covering is a small species of Pitch Pine with a short leaf, growing on the lower and middle regions, while for some distance below the snowy tops there is neither timber nor herbage of any kind." This Pine is considered by Dr. Coues to be *Pinus flexilis*, the Rocky Mountain White Pine, but this species could never have been mistaken for one of the Pitch Pines, and our

* *History of the Expedition under the command of Lewis and Clark.* A new edition by Elliott Coues. In 4 vols. Francis P. Harper. New York, 1903.

travelers, who were certainly familiar with the eastern White Pine, would have at once noticed its resemblance to that tree. It is more probable that they saw the Lodge Pole Pine, one of the forms of *Pinus contorta*, which is one of the commonest trees in this region.

Having crossed the continental divide and being on the waters of the Lemhi River, Captain Lewis found bushes of White Maple on the 13th of August (ii., 487), which Dr. Coues rightly refers to *Acer glabrum*, the only Maple of the Rocky Mountains with the exception, of course, of the Box Elder, which was well known to our travelers and which is quite generally distributed through all this region. *Acer glabrum*, which was discovered at this time, was technically described in 1824 by Dr. Torrey among the plants found by James in Colorado.

On the 23d of August Captain Clark reports on the Salmon River (ii., 532) tall Pine-trees suitable for the construction of canoes. This is another reference to *Pinus ponderosa*, which is the common and largest tree of the region. On September 3d (ii., 579), being then on Fish Creek, before reaching the Bitterroot valley and near the present boundary between Montana and Idaho, he reports the country as well supplied with Pine, and in the low ground "a great abundance of Fir-trees and underbrush." There is some doubt about the identity of these Fir-trees, but it is probably the Douglas Fir or Spruce (*Pseudotsuga*), which is not rare in this region. If this surmise is correct, it is the first reference in this work to this tree which later the party found abundant near the mouth of the Columbia River. On the 9th of September the travelers were crossing the Bitterroot Mountains by the Lolo Pass. Here they found the timber (ii., 596) "almost exclusively Pine, chiefly of the long-leaf kind, with some Spruce, and a species of Fir resembling the Scotch Fir." The long-leaved Pine is, of course, *Pinus ponderosa*. The Spruce is probably *Picea Engelmanni*, which would have been seen here then for the first time by white men; and the Fir "resembling the Scotch Fir" is clearly the Lodge Pole Pine. It may have been this tree which is spoken of as Spruce Pine in the entry of September 12th (ii., 593). Under the entry of September 16th (ii., 598), the party still being engaged in crossing the Bitterroot Mountains, the road was obstructed by "a growth of eight different species of Pine." These must have been *Pinus ponderosa*, *Pinus contorta*, *Abies grandis*, *Abies lasiocarpa*, *Picea Engelmanni*, *Pinus flexilis*, *Pinus Monticola* and *Thuja gigantea*, the evergreen trees which compose the forest of these mountains. Under the entry of September 20th reference is made to an Alder (ii., 605), referred doubtfully by Dr. Coues to *Alnus incana*. It is more probably the *Alnus tenuifolia* of Nuttall, who found it in the Blue Mountains of Oregon and described it in 1842 in the first volume of his *Sylva of North America*. This is the commonest Alder of the Bitterroot region. The *Arbor Vitæ* reported on this day (ii., 605) as very common and growing to a great size, being from two to six feet in diameter, is referred doubtfully by Dr. Coues to *Thuja occidentalis*. It is really the western *Thuja gigantea*, which ranges from the coast inland to the Bitterroot Mountains and the western slopes of the continental divide in northern Montana, and which, although it had been seen on the coast of British Columbia by Mackenzie in 1793, and by Menzies in 1796, was not described until 1834 by Nuttall.

The Hackberry seen on the 12th of October on the Columbia River (ii., 629), and referred by Dr. Coues to *Celtis reticulata* of Torrey, was more probably the thick-leaved form of *Celtis occidentalis*, which is not rare in the north-west, *Celtis reticulata* being a tree of the south-west, and now usually considered a geographical form of *Celtis Mississippiensis*. On the Columbia they observed the fruit of the White Oak, *Quercus Garryana* (ii., 654), used as food by the Indians, who told them they had procured it from a tribe living near the great falls of the Columbia, where this tree is still common, and where our travelers saw it on the 29th of October growing on hills near the mouth of the Klikat River, in company with a Pine, which is still *Pinus*

ponderosa. Near the mouth of Wind River, Oregon, which is just above the town of Sprague, and which Lewis and Clark called "New Timber River, from a species of Ash which grows on its bank, . . . and a timber resembling the Beech in bark, but different in its leaf, which is smaller" (ii., 679). The Ash is *Fraxinus Oregona*, which grows to a large size on the lower Columbia River. The new timber Dr. Coues unhesitatingly called the Broad-leaved Maple, *Acer macrophyllum*, but the large and deeply lobed leaves of that tree could never have been mistaken for the leaves of the Beech. The bark of *Alnus rhombifolia* has some resemblance to that of the Beech-tree, and the leaves are not very unlike Beech leaves in outline. There is certainly no other tree on the Columbia with Beech-like leaves.

The Spruce Pine seen on November 2d (ii., 688) near the Columbia below tide-water, growing with Pine, Cottonwood, a species of Ash and some Alder, was probably *Pseudotsuga*, and the Cottonwood is *Populus tricarpha*, which is the species of the lower Columbia, and which our travelers had not noticed before. The Pine seen here in low ground is probably *Pinus contorta*. The Ash is *Fraxinus Oregona*, the only species of the region, and the Alder, either *Alnus Oregona* or *Alnus rhombifolia*.

On the lower Columbia, in the entry of November 4th (ii., 693), the Wild Crab was noticed growing near the river. This is the first mention made by Lewis and Clark of *Pyrus rivularis*, which had been discovered a few years earlier by Archibald Menzies. On November 13th (ii., 706), when the party was near the mouth of the Columbia, they found that "the whole lower country was covered with almost impenetrable thickets of small Pine, with which is mixed a species of plant resembling Arrow-wood, twelve or fifteen feet high, with a thorny stem, almost interwoven with each other, and scattered among the Fern and fallen timber." The Pine may have been *Pinus contorta*. Dr. Coues refers the thorny plant to *Crataegus rivularis*. This, however, is a species of the interior; it may have been *Crataegus Douglasii*, or *Pyrus rivularis*, which grows in low ground and is often beset with short lateral, thorn-like branchlets.

On the 18th of November (ii., 712) Pine-trees were seen "three or four feet in thickness growing on the bodies of large trees, which, though fallen and covered with moss, were in part sound." This is a familiar sight in the forests of the north-west coast, where the seeds of several conifers, especially of the Hemlock, *Tsuga Mertensiana*, germinate most readily on the trunks of fallen trees. Having crossed from the north to the south bank of the Columbia on November 26th (ii., 722), they found a "thick growth of Pine, Balsam and other timber." The Balsam here is *Abies grandis*, which the travelers had seen for the first time in descending the western slope of the Bitterroot Mountains. In describing the country in the neighborhood of the winter camp south of the mouth of the Columbia, under entry of November 30th (ii., 724), they say, "the hills along the coast are high and steep; the general covering is a growth of lofty Pines of different species, some of which rise more than two hundred feet, and are ten or twelve feet in diameter near the root." The only trees which attain this size in this region are *Picea Sitchensis*, *Pseudotsuga taxifolia* and *Thuja gigantea*. They noticed here a plant which is called "Laurel," which Dr. Coues considers to be *Rhododendron Californicum* (not *Californianum*), but it is quite possible that by "Laurel" was intended *Arbutus Menziesii*, which is a conspicuous small tree in the coast region at this point.

On the 13th of December (ii., 734) the party were engaged in building huts for their winter quarters, and were rejoiced to find that "the beautiful Balsam Pine splits into excellent boards more than two feet in width." The Balsam Pine is here referred by Dr. Coues to *Pseudotsuga*, but the wood of that tree does not split particularly easily, and the planks were probably obtained from *Abies grandis*, which is abundant here. It is a tree much more readily felled than *Pseudotsuga* and the wood splits easily.

Notes.

Under an act of the Legislature the College of Agriculture, at Cornell, offers to give farmers the advantages of the University Extension movement. Any farmer may address Professor Bailey and receive a plan for a course of reading for winter evenings upon topics relating to agriculture, and after reading there can be a discussion with the college. As the spring opens, some simple experiments will be suggested to all readers by which they can test the truth of the principles taught, and there is no expense connected with the work.

An examination for gardeners will be held by the Civil Service Board on January 29th, at the office of the Commission, at ten o'clock, A. M. All persons who desire to try for the position of gardener in the public parks of this city should make application to S. William Briscoe, Secretary of the New York City Civil Service Commission, for blanks, the filling of which will entitle them to examination. Persons who have large experience in general gardening and nursery practice are desired, and every candidate will be required to give letters of recommendation from previous employers.

The American Florist reports that from all the important cities during the late holiday season there was a general increase in the sale of plants for holiday gifts as compared with that of cut flowers, and the tendency seems to be more toward the arrangement of plants rather than of cut flowers for the decoration of tables and mantels. This change is attributed partly to the excessive price of flowers which are held in cold storage for holidays and other occasions when there is a large demand for them. Perhaps, however, a sufficient reason will be found in the fact that for many purposes entire plants are a great deal more effective, as they certainly are more enduring.

Mr. George Monro, a fruit dealer in Covent Garden, writes to *The Gardeners' Chronicle* in reference to a statement made in that paper, that the bulk of the fruit sold in England is foreign-grown, to say that while this is quite true as applied to apples and oranges, there never were so few foreign grapes sold in the English markets. Almeria grapes used to be the staple article for Christmas trade, but English growers now furnish a better article in such quantities as to make consumers of the best class quite independent of foreigners. Mr. Monro adds that for four days preceding Christmas he sold four thousand baskets of English grapes, weighing twenty-two tons and a half, and he adds that English growers are now turning the tables on foreigners by sending regularly to America, and almost daily to the Continent, consignments of cucumbers and grapes.

The city of Los Angeles has just come into possession of land which may become one of the most interesting pleasure-grounds in the world. The tract of three thousand acres is situated along the Los Angeles River about a mile north of the city limits, and comprises a rich diversity of soil and surface. It has been known as the Rancho los Feliz, the property of Griffith J. Griffith, Esq., who has presented it to the city of his adoption with the single restriction that if a charter is granted for a railroad to the park from the town a single fare shall be limited to five cents. Part of the land lies within what is called the frostless belt, and it rises over foothills and a mountain slope from whose summits there is a magnificent view, including the city and the sea. Altogether it is a royal gift, and it is to be hoped that the city will appreciate it and see that the natural beauty of the place is not marred by the handiwork of unskilled park makers.

As attractive and toothsome as any of the many table luxuries in the stock of high-class fruiterers and grocers are such choice dried fruits as Malta dates. These come neatly packed in fancy boxes holding a pound of the fruit on one stem, and cost fifty cents. Small boxes of stuffed dates, the kernel of a Pecan nut being substituted for the seed, cost twenty-five cents. Large Smyrna figs, tightly pressed into wooden boxes, cost thirty cents a pound. Carefully selected "pulled figs," known as Royal Locoum, from Turkey, their natural form retained, cost thirty-five cents a pound, and extra-large pulled figs, sixteen of the fruits to a pound box, sell for fifty cents. Square packages, holding four pounds of choice layer figs in attractive silk covers, cost \$1.50. Extra-sized California prunes may be bought for fifteen cents a pound; choice French prunes, esteemed for their rich flavor and more tender skin, cost twenty-five cents a pound in bulk and forty cents in glass jars. Wiesbaden stuffed prunes, the seed space filled with the flesh

of other prunes, are regular articles in trade. Malaga cluster raisins of the high grade known as Five Crown, cost \$1.60 for a five-pound box, or thirty-five cents for a single pound, while the best California raisins cost twenty cents a pound.

General C. A. Andrews, Chief Fire Warden of Minnesota, in an address before the Forestry Association of that state on January 14th, said that during the dry weather in 1895 and 1896, although the seasons were not as dangerous as that of 1894, there were many forest fires, most of which were soon under the control of the fire wardens. He thinks that, owing to the number of new settlers going into the forest regions to open farms, the danger of fires will increase, and the important thing will be to prevent any of them from becoming serious. He argues that it is easy to prevent forest fires in Germany, because every one there is taught in the public schools enough of forestry to give him a knowledge of the value of forests to the country; and inasmuch as forest preservation is best promoted and forest fires most certainly prevented by diffusing a knowledge of forestry and creating an intelligent interest in it, he suggests as a good plan that some of the elementary principles of practical forestry be taught in all the public schools of the state.

In a Farmers' Bulletin on "Irrigation in Humid Climates," by Professor King, it is stated that although the total rainfall in western and southern Europe is materially less than it is in the eastern United States, we must bear in mind that our summer temperature and amount of sunshine are both higher, that the air is less moist, and that under these conditions water is lost from the soil more rapidly by evaporation than it is in Europe, and, no doubt, irrigation might be practiced to as good advantage here as there. In Europe there have been irrigating canals since the invasion of the Moors, and in England there are water meadows so old that no one seems to know their origin. In those places where water is artificially supplied it is thought that the fertility added to the soil is the chief advantage derived from the practice, and for this reason large volumes of water are run over the land during the winter or when it is not occupied by a crop; and, no doubt, it is true that in river water there is much matter of fertilizing power, and that it is more valuable, pound for pound, than solid fertilizers which we buy, because it is already in solution and ready to be taken up immediately. The water meadows of England have been in service without rotation and without the application of fertilizers of any kind for probably five hundred years and they are as productive to-day as ever. These lands are valued very highly because they can be watered for less expense than it would cost to haul manure upon them, even if this could be had for nothing. The crops are absolutely certain, and with from twenty to forty acres of such meadows unirrigated lands can be maintained in a high state of productiveness through the use of the manure made from the product of the meadows.

Among dainty flowers for house decoration displayed in the best shops are branches of white-flowered Almond, the neat little flowers densely set among delicate new leaves. Flowers of the pink variety of the same shrub are also offered, and of the more showy Japan Quince, with masses of Forsythia profusely covered with its yellow bells. Glossy brown shoots of Pussy Willow, dotted with mouse-colored, downy catkins, are shown, and, less freely, apple-twigs in blossom. A well-furnished vase of branches of any one of these forced flowers costs \$5.00. Carnations are now in splendid form; among large, vigorous flowers of many varieties those of the comparatively new Lillie Dean are strikingly handsome; the irregular arrangement of the broad white petals, dashed with red, forms a large bold flower, and the calyx is remarkably good. These sell for \$1.00 a dozen, the price for other varieties ranging from fifty cents to \$1.00. Orchids are lavishly used in some of the window arrangements of first-class floral establishments, but the display is not so extravagant as it appears, since the same flowers which win the admiration of passers-by in the fashionable promenade hours of the day are used in dinner decorations in the evening. Cut flowers of *Cypripedium insigne* and *Dendrobium nobile* cost twenty-five cents each, and of *Cattleya Gigas* twice that amount, and sprays of *Odontoglossum* maximum \$2.00 to \$3.00, according to the number of blooms carried. Flowers of *Amaryllis*, *Lilium Harrisii* and *L. auratum* are offered at \$3.00 a dozen, and *Calla lilies* cost \$1.00 to \$1.50. Among the roses excellent flowers of General Jacqueminot are occasionally seen, but, of course, Bride, Bridesmaid, Meteor and American Beauty are the principal varieties sold, and, like all other flowers, large lots have been selling at remarkably low prices.

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The Need of More Public Pleasure-grounds.

DURING two or three years past several local societies have been formed in England for the purpose of saving from defacement or desecration places which have some special beauty, which command some attractive scenery or which appeal to patriotic feeling by some historical or legendary association. Representatives of these societies now point out that a suitable way of commemorating the fact that Queen Victoria has worn the crown longer than any of her predecessors would be to dedicate pleasure-grounds to the enjoyment of the people forever in various parts of the kingdom. Of course, this scheme is not confined to large towns and cities, but embraces all parts of the country. While localities of historic interest or spots which have some especial charm of landscape are spoken of as preferable selections, the leading purpose is to secure a public pleasure-ground and call it the Queen's Field, or the Queen's Park, or the Queen's Garden, or whatever name would be most appropriate. Hill-tops which command broad views, bits of woodland, stretches of water, still or flowing, cliffs and downs, old castles and other historical remains are all suggested. It is pointed out in the memorial that even in the distinctly rural districts of England there are many counties with no recreation-grounds, no village commons or greens, no playgrounds for children. Instances are given where grounds thrown open to the public, even in remote and solitary places, are no longer solitudes, but are thronged with men, women and children. In speaking of this proposal, *The Outlook* for last week says:

England is rapidly becoming so crowded that even in out-of-the-way places the need of breathing-places for the people is beginning to make itself felt. It would be difficult to imagine a more practicable or charming commemoration of the length of the Queen's reign than that presented by this committee, and it is a suggestion worth careful consideration in this country. No American village ought to be allowed to extend rapidly without retaining some place for a pleasure-ground. Beautiful views in this country are often to be seen only from private property; the places from which they are obtainable are inaccessible by proper paths, and when one reaches them there are no seats or other provision for comfort. In Germany there is always a well-worn path leading to any beautiful view,

and there is generally provision for enjoying the view when one reaches the point. We need in this country a national endeavor to protect our fine scenery and to open it up. We need countless footpaths running from the main roads to points of outlook, and we need provision for rest at these points. All this involves very little expense; it is distinctly educational; and it would go far to ease the pressure of hard conditions on the host of people who now feel that they are cut off from the common enjoyments of life. Beautiful views ought to be public property, for no man owns the landscape, however the fields may be divided among individuals. American communities everywhere could not do better for their citizens and for the future than to cast about for places which, by dedication to public use, may become the pleasure-grounds of the people.

Readers of this journal do not need to be told that we are in full sympathy with these views. It is not mere sentimentalism that has prompted wise men in every generation to put themselves in close contact with the beauty of the outdoor world. It is a recognized truth that communion with nature is an effective agency in establishing a sound mind in a sound body. We, therefore, believe that natural beauty is a possession to be prized and cherished by a community, and we repeat what we have before said, that "the reckless destruction of this beauty is a blow, not only at one of the highest and most satisfactory pleasures of the people, but at the public health and wealth." We believe that it is one of the inalienable rights of man to enjoy natural scenery and the pure delights it offers, and that it is, therefore, one of the duties of society which has inherited this beauty to transmit it unimpaired to posterity. We believe that it should be protected not only against the advertising plague, but against the heedless assaults of business enterprise, for the men who build railroads, sink oil wells and open mines, naturally take no thought of the desolation they make, because no one esteems landscape beauty as one of the vital necessities to the mental and spiritual health of the people. A few forward-looking citizens are protesting against the stripping of the forests from our mountain tops because this impairs the natural and needed supplies of timber and water. Why not protest with the same energy against the destruction of the woods because it mars the beauty of the landscape, which is just as truly an inheritance to be cherished as wood and water? If the moral sense of the people were educated to its proper level the wanton defacement of natural scenery would not only be a misdemeanor in law, but it would be considered an offense against common decency, and the man or corporation who heedlessly and needlessly defaces the beauty of the world would be classed among the enemies of society. It is not only such marvels as Niagara, the Palisades, The Dalles of the St. Croix, the Yosemite Valley and the great gorge of the Colorado which ought to appeal to us as a special charge for which our civilization is responsible, nor is it only places of such notable historic association as Plymouth Rock and Valley Forge and Missionary Ridge which should be held sacred. There is in almost every town some spot invested with a poetic charm, or with some traditional interest which each community ought to feel bound to preserve for its successors.

The scheme for county and township parks like that of Professor McBride, of the State University of Iowa, which we advocated last year, is one that ought to attract attention both in the east and the west. The time may come when wooded parks, if of considerable size, can be made useful as object-lessons in forestry, although this period may be too remote to be seriously considered as an argument for their establishment. In the more recently settled regions of the west such public holdings would be most interesting from the fact that they might preserve the original flora of forest and field before it is laid waste. There is not a town in the east which would not be richer for a few acres of its primeval woods in which were preserved some of the original animals now almost totally exterminated. The bolder features of the land still remain to show something of its primitive form and beauty, but the Hemlock groves which darkened its glens are gone;

its knolls once wooded are bare, and many another picturesque feature which could have been saved fifty years ago is lost forever. There is virgin soil still in the distant west, and it would be a worthy ambition there to save some of these picturesque places and preserve them for public assembly grounds and parks for the people.

The very phrase "pleasure-grounds" gives an unanswerable reason for setting apart such reservations. Of course, people in the country do not need the sight of green fields for the same reasons that people in the city do, but they need refreshment and recreation even more. No life is more monotonous than life on the farm, or in the factory or mine, with its unending round of daily toil. The farmer's family and the farmer himself come into contact with nature, it is true, but it is rather in the way of conflict than of companionship. It is from nature that he wrings a living, and nature is not always kind. Aggressive forms of animal and vegetable life contest his right to win his bread from the soil, and perversities of climate often give aid and comfort to his foes. Life on the farm is often hard enough to make men and women hopeless. There ought to be more holiday time to brighten life; more frequent halts for rest in this sullen march to the grave. Unless more cheer and refreshment is provided—more natural and wholesome recreation—coming generations will bear witness to the depressing power of this pitiless grind in dulled minds and dwarfed bodies. No more delightful change from the hard and narrow lines of rural life can be imagined than that afforded by some alluring pleasure-ground to which country people could be drawn to spend a day now and then in social mood and holiday attire upon the grass and among the trees. A day now and then, with all its hours undarkened by care, with games and music and dancing and neighborly companionship, would have a priceless recuperative value for the rural population of the country.

Notes of Mexican Travel.—XII.

MY SUMMER IN THE VALLEY OF MEXICO.—I.

IT was my happy fortune on my twelfth Mexican journey to settle in convenient quarters in the capital city about the end of May, 1896, for the purpose of studying and collecting the plants of the surrounding regions, but especially those of the Valley of Mexico. Two trained and faithful assistants were with me, an American of two previous journeys, to dry the plants with judgment and skill, and a Mexican who had served me in Oaxaca, but was now drawn from the police force of the city, to accompany me in the field, to make way for me among his countrymen and gather plants with judgment and untiring industry. At first I contemplated trips to certain districts in contiguous states to which I had long been attracted; but, as the season advanced and the richness of the flora near at hand manifested itself, I gave up thoughts of making such digressions, and during all the season scarcely got fifty miles away from Mexico City. It was the Cuernavaca region alone, that region which had so charmed me the previous autumn and had then repaid my exploration with so many novelties, that could allure me away from the wonderful Valley of Anahuac, the fair prize for which Toltec and Aztec and Spaniard and Mexican have successively contended.

Hence it is only of the country lying between Tula on the north and Cuernavaca on the south, a tract lying on the crest of the continent at an elevation of from 7,000 to 10,000 feet, with snow-capped peaks towering on either hand, that I have now to write. In working this region I was in the favorite field of many a botanist from the Old World, many a veteran collector from the time of the courtly Spaniard, Hernandez, down to the days of Bourgeau, who, from gathering the flora of various lands, came finally as botanist to the French Scientific Commission under the rule of Maximilian. Here, high under the bright tropic sun, in an atmosphere always fresh and invigorating, I went forth to

my work in the fields each morning with gladness; and whatever the direction of my search I never failed to bring in at night a burden of choice plants. For this work I enjoyed large advantages over the earlier collectors. Whereas, they at best could only reach the better collecting grounds by long rides in the saddle, and must have worked in much personal peril, I, thanks to the efficiency of the present Government, could feel nearly as secure in remotest cañons as in my native fields; and in modern steam cars could gain the vicinity of nearly all points of botanical interest. The officials of the Mexican Central and the Cuernavaca railroads not only extended to me the fullest courtesies of their lines, but manifested an intelligent and friendly interest in my explorations.

My location was near the station of these two railroads in the Buena Vista quarter of the city. This is the West End of Mexico, the modern and growing part of the city, with open squares and broad clean streets and boulevards, adorned with monuments and statues, sometimes bordered with trees, full of white sunshine and flanked with elegant mansions. All of this is in widest contrast with the East End of the city, the ancient Mexico of the Viceroy, crowded, dingy and dirty. A mile away in the Zocolo, or central plaza, I could take cars of the District and the Valley railroads, the former leading due south ten miles over wet meadows to Tlalpam, planted at the foot of the hills and close to the east edge of the lava-beds; the latter bearing into the south-west, first over soft meadows, then over dry land and through the suburban villages of Tacubaya, Mexcoac and San Angel to Tizapan, which is situated on the west edge of the lava-beds toward the base of the Peak of Ajusco. Near the northern edge of the lava-beds, between San Angel and Tlalpam, are the villages of Coyacan and Churubusco. The shady lanes and hedgerows and waste grounds about all these villages of the valley yield not a few plants welcome to the collector. An hour's walk beyond Tizapan brings one to the foot of the factory-town of Contreras by the mouth of a deep cañon which divides the Sierra de Ajusco on the south side of the valley from the Sierra de las Cruces on the west side. But Contreras is best reached by train of the Cuernavaca Railroad; and its environs of flowery hillside and mountain top, of rocky barranca and wet and shady cañon, of mesa and lava-beds offer to the naturalist or the pleasure-seeker, perhaps, the choicest and most varied field of the valley. Scarcely more than a mile beyond Contreras, and close by the station of Esclava, at the foot of Ajusco, are beautiful groves of Pine, *Pinus leiphylla*, with gentle glades dividing them; and behind these you can follow up a mountain cañon into the shade of great Firs, *Abies religiosa*. When the train has carried you along up through woods that are a wild Dahlia-garden—masses and masses of flaming blooms, three species of Dahlias in twenty distinct colors—and has brought you up to the heights of the Serrania de Ajusco, you are again in groves of Pine, *Pinus Montezumæ* now, which are equally beautiful, and from which you can look out over the wide panorama of the Valley of Mexico.

For gaining the heights of the Sierra de las Cruces on the west of the valley there is in earliest morning the train of the Mexican National Railroad. After two hours mostly spent in threading deep cañons, we alight on the open and grassy Plain of Salazar, some 10,000 feet above sea-level, where the patriot Hidalgo, with his rude hordes, dealt the Spaniards a first surprising blow in the war for independence and then wandered away from his field of victory to find, through treachery, imprisonment and death. Because I had already worked these mountains during several years, I only returned last season to glean a few last things such as *Weldenia candida*, whose lovely white flowers rise on slender tubes from a star-like cluster of leaves.

The train of the Mexican Central Railroad bears one northward in the morning over flats often planted with Corn, over hills interrupting these and down through the Tula valley, some forty miles from the city. Here we may alight in a region to which I gave considerable attention.

The narrow valley is bordered by bluffs and hills of softest calcareous formation, and about these I found certain plants which Coulter and others discovered about Zimapan, a region of similar soil to the northward, but in the same state of Hidalgo. The most conspicuous of these was *Leucophyllum ambiguum*, a shrub from four to six feet high, with whitened leaves and numerous bluish purple flowers. From Hemsley I fail to learn that Tula was formerly visited by more than one or two passing botanists.

But it was chiefly the lava-beds, or pedregal (place of rocks), so often mentioned in Hemsley's work, which held me closely about Mexico City till the end of the season. From numerous craters, lofty or low, scattered about the Serrania de Ajusco, that mountain expanse, twenty miles broad and 9,000 to 10,000 feet elevation, bounding the Valley of Mexico on the south, streams of lava have flowed down through a distance of twenty-five miles over nearly all the mountain-side and over the southern edge of the valley, whose altitude is about 7,300 feet. These lava-beds present wide areas of wildest aspect, which are most difficult to travel. Sharp ridges alternate with deep crevasses, while pits and grottoes abound. These tracts are reputed to have been the retreat in former times of dangerous men, of wild cattle and of venomous reptiles. It is probably due to such difficulties and perils that the pedregal, though coming down so near to the city, appears to have been little explored by the earlier botanists beyond the immediate vicinity of Tizapan and Tlalpam, or San Augustin de las Cuevas (caves), as this town was called in Humboldt's day. Doubtless it was once covered with a scanty forest growth, as are its more remote portions to-day. Only about its borders, and especially in the neighborhood of villages, is it yet overrun by goats and other domestic animals. It still lies and must ever remain an untamable wild, a natural preserve, in whose sheltered and inaccessible recesses numberless species of plants perpetuate themselves in security. As I toiled over it day after day, wandering widely, though constantly harassed by vexatious obstacles, I met with frequent surprises. Plants whose acquaintance I had made in remote states came in view—plants of mountain-top, of plain and of valley. Some of these were met with only once or twice. To my last day there I was wont to find in some peculiar nook a species not encountered there before by me. Hence it is impossible for me to feel that I have exhausted the plant treasures which the pedregal holds. The track of the Mexico, Cuernavaca & Pacific Railroad is laid across the lava-beds on the sides and on the summit of the mountain, and thus to every one are now opened the interest and beauties of this incomparable region. What a vast and unique natural park is this pedregal, lying close beside a populous city, and how desirable that it be set apart for a public park, be saved from further spoliation by the wood-cutter and be more extensively opened to travel.

Charlotte, Vt.

C. G. Pringle.

The Winter Solstice at Madeira.

THE island of Madeira is exceedingly rich in its native flora, and from its situation it has climatic advantages which make its fields and gardens remarkable for the variety and quality of their productions, the rapidity with which one crop follows another, and the general abundance of its fruits and flowers and vegetables. Swift steamers now carry the perishable products of the islands to the English markets and bring numbers of English tourists for a brief holiday to the equable climate, which ranges between extremes of seventy-four and sixty-three degrees, Fahrenheit. It is said that improvements in the water-supply and drainage in the city of Funchal have been undertaken which will give it great additional value as a health resort. M. Grabham, a correspondent of the *London Garden*, writes in such an entertaining and instructive way of the winter aspects of the gardens of Madeira that we reproduce the article almost entire:

The autumnal appearance of the gardens of Madeira is

characterized by a revival and burst of vegetation distinctly vernal, and suggesting the existence of conditions which in point of climate are truly spring-like. Thus, immediately on the fall of the first rains, after a long period of dryness, the ground becomes clothed with new growth; Roses start, bud and blossom, fruit-trees (Apples and Peaches) revive and flower, and there is a general return to an appearance which existed in March and April, though less marked in vigor. Something of this is due to the equivocal character of the climate as to spring and autumn, but much also is due to habit in plant-life and the hesitation shown in adopting the routine of new circumstances; hence, after many years, several species introduced from the southern hemisphere have quietly settled into their original seasons, and have their periods of spring growth and full vigor of flowering at our coldest seasons, even in the mountains—*Acacia dealbata*, for example. Others will maintain as long and completely deciduous a season as they were accustomed to in the north, and decline to be moved by even an excess of sunny, showery summer weather—*Platanus*, for instance. About twelve years ago I introduced a new species of *Pancratium* from South America; these plants have thriven and multiplied, but some groups will spring up, flower and die down in October, and others will perform their functions in March and April. Other and more occult differences exist in the behavior of examples of the same species at varying altitudes, suggestive of profound physiological influences in different environments. But the general effect of the unvarying mildness of the climate of Madeira is to prolong the season of active growth and to render it in many cases enduring and permanent, and in other cases to multiply the periods of growth in number in a given period. The gardens at Christmas are not without a free growth and flower show of most kinds of *Geraniums*, but *Pelargoniums* are generally quite out of bloom now. Familiar annuals are growing rapidly, and some few are in flower—*Stocks*, *Mignonette*, etc. To a new-comer the show of *Roses* is truly surprising, *Lamarque* covering enormous spaces over gateway and balcony with fragrant masses of flowers in countless numbers, while *Adam*, *Cloth of Gold* and other less well-established varieties are among the climbers of the class also in full flower. In the beds almost any kind of *Rose* well known in England is to be seen covered with large attractive blossoms. *Camellias* in all the shades supplied from *Oporto* are in full season in many gardens and in profusion.

Two species of *Bougainvillea* which blossom in winter, *B. spectabilis* and *B. lateritia*, just now cover many a wall and lattice with their deeply colored and prolific flower-bracts. *Bignonia venusta* is quite as striking and extensive. Giant specimens of *Poinsettia* with tree-like growth, great bushes of *Salvia* and *Hibiscus* of several sorts, combine to dazzle and astonish the visitor from the north, while among the usual garden plants are the Sweet Canary Violet, two sorts of *Streptolizia*, many kinds and shades of *Azaleas*, splendid *Rhododendrons* (chiefly beyond Funchal), quantities of familiar and unfamiliar *Irises*, all lovely, all quite at home, large bushes of sweet *Olive*, sweet-scented *Heath*, *Lemon-scented Verbena*, showy *Bouvardias* of many shades, long sprays of scarlet *Euphorbia*, hedges of blue *Plumbago* and *Heliotrope*, overhanging bushes of *Brugmansia* covered with white trumpet-flowers, charging the night air with their aroma and reflecting pale light in the bright moon. *Palms* and *Cycads* are intermixed, some in fruit, and specimens of *Aralia*, *Castor-oil Bean* and giant *Echium* are to be seen growing freely with flowering *Aloes*, bushes of *Spiræa*, *Pittosporum* and *Bottle-brush*, which in a Madeira garden live healthily together and confound any preconceived ideas of growth proper to latitude or altitude. Nor do the larger trees offer any more definite idea of a given district or zone, for the deciduous examples of the north and south grow promiscuously and harmoniously with the *Camphor Laurel* from *Formosa*, the *Acacias* of *Australia*, the *Laurels* of *Madeira*, the *Mango* of *India*, with the *Erythrinæ*, *Magnolias*, *Casuarina*, *Bignonias*, *Schinuses*, the *Celtis*, *Cercis*, *Ceratania*, the *Persea gratissima* (with its Pear-like fruit), and every conceivable diversity.

The kitchen-garden is not less interesting or comprehensive, and abounds at this season with green *Peas*, *Beans* and *Lettuce*, with most of the familiar esculents of our home gardens added to the list. Several sorts of *Gourds*, one of them especially (*Sechium edule*), a small and delicately flavored vegetable, almost perennial in habit and yield, a small uncultivated *Tomato*, as well as several important additions to the *Mints* and herbs of our home growth; a *Yam* (so-called) and an important country food, the *Sweet Potato*, a tuberous-rooted *Convolvulus* (one to be seen on every side), and well-known varieties of the *Potato* appear in successive crops. Among

the fruits, Oranges figure conspicuously at this season, and enormous trees are everywhere seen heavily freighted with them. The Tangerines are plentiful and good; the Mango is almost over, and so also the Alligator Pear. Guavas and custard Apples are plentiful; Strawberries are ripening fast, and there is plenty of Apples and Walnuts. Coffee is grown abundantly. Many of us cultivate our own Arrowroot, which is excellent; and much use is made of the so-called Cape Gooseberry (*Physalis Peruviana*). The Citron is only seen in gardens here and there, but grows perfectly, and is most excellently candied in the island, as are also many other fruits in their season.

Nectria on Currant Canes.

FOR a number of years there have been complaints from several places in the state of New York of a serious trouble with Currants. Nearly two years ago, from material sent me, it was evident that the trouble was due to the parasitism of a species of *Nectria*. Entire bushes were received, and while the larger part of the canes were dead, most of the roots and some of the lower ends of the canes were still alive. From these living parts of the canes new shoots had developed; in some cases a number of small shoots quite close together, so that the appearance was something like that presented by the so-called witches' brooms. It is not a true broom, however, since the development of the new shoots is not stimulated by the action of the fungus, but is the endeavor of the plant to produce new shoots or replace the dead ones.

The diseased plants first show a yellowing of the leaves. The leaves later wither and fall. The fruit often reddens prematurely, and if the injury is serious some time before the time for ripening the berries often wither. Sometimes the canes are killed before the leaf and flower-buds are fully opened, and in such cases the dried buds with partly opened leaves remain on the canes. Infection probably takes place through some injured or cut surface, and cuttings from diseased plants, or from apparently healthy ones in places where the disease is present, are probably one prolific source of the trouble.

Dr. E. J. Durand, formerly assistant botanist for the Experiment Station, and now instructor in botany in Cornell University, was detailed to study the disease. He visited the districts where the trouble existed, made a careful study of the external symptoms and collected material for a study of the life-history of the parasite. Artificial pure cultures of the fungus were made, and stems containing the conidial stage were placed in a cool, shady place in a small wood in order to obtain a larger number of the perfect stage of the fungus, some of this having been found on the canes from the field at the time the plants were obtained.

Two species of *Nectria* were present, and some careful study was necessary in order to separate the two conidial forms and properly correlate them with the perfect forms. One of the fungi proved to be the well-known *N. cinnabarina*, which is widely distributed both in Europe and America as a saprophyte, but also occurs as a parasite, according to Hartig and others. This *Nectria* was connected with the conidial form known as *Tubercularia vulgaris*. This forms bright pink elevations, which have their origin from the mycelium which grows in the cambium of the cane. These elevated masses of the fungus rupture the bark, and are thus exposed. The spores are borne at the outer surface of this mass, and are thus easily freed and carried to other canes. The perithecia of the perfect form are later borne on this stromatic mass, and are in the form of oval flasks, with a minute opening at the free end. Inside of these flask-shaped fruit bodies are numerous elongated club-shaped sacs, each of which contains eight spores, called ascospores. These ascospores are different in form from the conidia, and are composed of two cells, while the conidia are one-celled.

The other fungus was lighter pink in color than the *Nectria cinnabarina*, and its conidial stage did not appear in the form of a prominent stroma. The perithecia, how-

ever, resemble those of the *N. cinnabarina* rather closely, and care is necessary to discriminate between them without recourse to the microscope. Here, however, we find a ready means of separating the two, for the ascospores of this one are many-celled, the divisions in the spore running both longitudinally and transversely, while the ascospores of *N. cinnabarina* have only one transverse partition. This fungus is the *Pleonectria berolinensis*, Sacc.

The most serious outbreak of the disease occurred in western New York, where a plot of Currant bushes of about three acres was affected. At the time the place was visited, in 1895, the bushes upon two acres had been destroyed and the remainder were badly diseased. A large number of cuttings taken from these plants made very little growth and also exhibited symptoms of the malady. The fact that cuttings showed the disease so soon indicates that plants should not be propagated from diseased stools or even from apparently healthy plants in the vicinage of infected ones. Mayer has shown that this fungus gains an entrance to living plants through wounds or cuttings. Once in the tissue it may become perennial, so that the twigs may contain the fungus at the time of making the cuttings for transplanting. Since the fungus may become perennial in the tissues affected, plants cannot be cured. It would probably be better to destroy them and for a few years plant some other crop in the ground.

The subject is one of such importance that Dr. Durand will prepare a monograph upon it for distribution by the Experiment Station.

Botanical Department, Cornell University.

George F. Atkinson.

New or Little-known Plants.

Mespilus grandiflora.

THIS is a small tree, distinguished by ovate-oblong, crenate and occasionally obscurely lobed dark green leaves pubescent below, foliaceous stipules, large pure white flowers, which are solitary or produced in few-flowered clusters, and lustrous, erect, russet-brown punctate fruit, slightly flushed with red. It has been an inhabitant of European gardens for at least a century, but its origin is uncertain. At different times it has been considered a European and a North American species; C. A. Meyer believed that it was a native of the Caucasus, and Karl Koch and many other authors saw in it a possible hybrid between the European *Mespilus Germanica* and either *Cratægus stipulacea*, a tropical American species, or the eastern American *Cratægus tomentosa*. We have no views to offer on the origin or parentage of this tree. In habit, however, in the general form and color of the leaves, in the flowers and in the rusty color of the fruit, it bears a close resemblance to *Mespilus Germanica*. The fruit, however, is smaller, distinctly punctately dotted, like the fruit of our *Cratægus punctata*, lustrous and tinged with red, and the opening of the calyx-tube is much narrower. In the Arnold Arboretum, where this tree is well established, it grows more vigorously than *Mespilus Germanica*, and its greater hardiness might indicate an origin in some cold country like the Caucasus, or a cross, if the plant is a hybrid, with one of our northern species of *Cratægus*.

But our object in publishing the figure on page 35 of this issue, which is a reproduction of a drawing made by Mr. Faxon in the Arnold Arboretum, is not to discuss the origin and history of this tree, but to call attention to its value in northern shrubberies and plantations, where it grows rapidly and is not attacked by the fungal diseases which in this climate defoliate at midsummer several species of *Cratægus*; the flowers are large and abundant, but the leaves, like those of many of the Old World trees, shrivel, turn brown and fall in the autumn without assuming the bright colors which make most North American and eastern Asiatic trees and shrubs such beautiful objects in the autumn landscape.

Cultural Department.

The Watering of Plants.

PROBABLY no operation in gardening is so important as that of watering, and none is more difficult for amateurs. A man may succeed in floriculture without having had experience, but if he fails it will almost surely be on account of his lack of knowledge in this particular. Injudicious watering

should be light for nearly all potted plants. It is preferable to have plants in condition to take water every day when the sun shines, and the evaporation ought to be sufficient to carry off a daily supply. If the soil remains moist for two or three days, except in freshly potted plants, I should consider investigation necessary, and would expect to find the roots in an unhealthy condition.

The use of manure-water for potted plants is an important part in their cultivation. The pot should not be too large, and



Fig. 6.—*Mespilus grandiflora*.—See page 34.

ruins more pot-plants than all other mismanagement. It is difficult to correct injury from mistakes in watering. Plants stand drought better than a deluge, but overwatering is the most common mistake. Potted plants which take a long time to drain are seldom in good health. It occasionally happens that plants which have made luxuriant growth choke up the drainage with roots, and unless this trouble is understood, too little or too much water may then be given. Free circulation of air is essential in the soil, which for this reason

it is always creditable to have good specimens in small pots. Small pots are possible only with healthy root-action. For this reason I always examine the vents in new pots, and sometimes have them enlarged. Some large specimen Chrysanthemums completely choked up the drainage through overfeeding, so that a series of holes had to be drilled around the base of the pot to allow the water to pass freely. If the water stands in the pots, air is excluded, and before many days the whole mass of earth would become sour and the plants die. In shifting on a

batch of young plants which it is intended to grow into specimens, though in the course of the growing season they will pass from four-inch into ten or twelve inch pots, it is better to move them by easy stages, say, not more than two inches at a time. It is essential that the roots successively use up the nutriment in each addition of fresh soil. It is well known that if the plants are at once placed into ten-inch pots the roots would strike directly for the sides of the pots, and do all their feeding there. By successive shifts a solid ball of roots is formed, so that when we come to use manure-water none of it will lie stagnant in the ball, where feeding roots cannot act. This is the essence of feeding pot-plants.

The soil for potted plants should be better supplied with plant-food than common garden-soil, as the feeding area is limited. The alkalies in the soil should not be made to supply food faster than it is needed. Water at once makes these available, and too much water means too great a supply, so that freshly potted plants should always be underwatered—just enough being given to keep the roots moving, until they are well established. Rain water is preferable, but the supply is so uncertain that we do not count upon using it. Besides this, our supply would be what is shed by the roofs, and this is often contaminated with lead and oil. We now depend altogether upon the town water. Chemicals as a means of purification render the water hard. It has occurred to me that we should use something to counteract or precipitate these. A little free ammonia would have a softening tendency, and I have found wood ashes to act in the same way. A friend of mine uses a pound of potash to two hundred gallons of water with excellent effect. Of animal fertilizers, the Colorado brand of sheep-manure is one of the best sources of liquid-manure. It is strong, lasting and safe. It is taken from sheds on the ranches, where it is kept dry and undiluted, and with the solid uric salts unleached, and available just as soon as a decoction is made. During the summer season we have a large cask always ready for use. In winter-time one tank is kept indoors especially for it. We place about a peck in a rather open-meshed bag and immerse the whole in about a hundred gallons of water. In this way we get a good clear liquid. Once or twice a week we go over all plants that have exhausted the natural resources of the soil, and pass by the weaker ones. If in good health we have found this treatment acceptable to all kinds of plants, not excepting Orchids and Ferns. *Cypripediums* showed a marked improvement, and *Lycaste Skinneri* never did better than with sheep-manure a component of the soil.

It is sometimes desirable to use chemical manures in liquid form, but they must be applied cautiously. At best they should be used as alternatives to vary the diet. Albert's Horticultural Manure has proved satisfactory with me in the proportion of a pound to a hundred gallons of water. It makes no perceptible difference in the appearance or smell of the water, and is therefore well adapted for use in conservatories attached to residences. It is remarkably quick in its action, but an overdose is disastrous. The good effects from its use are apparent in a day or two. In healthy plants the fresh roots come to the surface in search of it, and the absence of roots is evidence that it is not acting properly. Whenever we have been unfortunate in the overuse of chemical manures we have promptly placed the plants in a tub of clear water to cleanse the soil as soon as possible, and then set them where they could dry out.

Wellesley, Mass.

T. D. Hatfield.

Greenhouse Plants in Flower.

IN a cool greenhouse a large plant of *Imantophyllum cyrtanthiflorum* is blossoming freely now. This plant is ornamental, even when it is not in bloom, on account of its very dark green, vigorous, strap-shaped leaves, which measure about a yard in length. Well-established plants in pots stand a good deal of rough usage and make good companions for such decorative plants as *Aspidistra lurida*, *Lantana Bartonica* and others. The salmon-colored flowers, produced in large umbels above the foliage, last for some time if the plants are kept in a rather cool place. After the plants are well established in the pots they do not need potting annually, and a good top-dressing of rich soil only is required.

One of the best *Acacias* now in bloom is *A. longifolia*, a quick-growing species, with abundant flowers borne on long slender branches. It is useful for cutting, and the flowers last for several days. Another easily grown *Acacia*, flowering profusely now, is *A. armata hybrida*. *Cestrum elegans* helps to brighten up the greenhouse, its long, slender branches terminated with cymes of purplish red flowers.

No greenhouse should be without a few plants of *Boronia megastigma*. Its flowers, although not showy, fill the house with their agreeable odor. Small bushes of *Centradenia floribunda* are always attractive, and the plants are now covered with its *Melastoma*-like flowers. *Centropogon Lucyanus* is an excellent winter-flowering plant, and its showy carmine-colored blossoms are produced for several months. It is not only useful as a decorative plant in the greenhouse, but for cutting, as its clusters of flowers can be procured with a good length of stem. *Strobilanthes amsophyllus* and *S. isophyllus* make nice, compact, bushy plants in one year, and the abundant lavender flowers, while not especially desirable for cutting, make a pleasing contrast with the other plants now in flower.

The deliciously fragrant flowers of *Brunfelsia latifolia* are always pleasing. Upon opening they are of a lavender color, but later become almost white. Although this plant is easy to grow and blossoms freely every season, it is not often seen now.

The long graciel wreaths of bright orange-scarlet bracts and flowers of *Euphorbia jacquiniæflora* are still in good condition and will be for some time. We could hardly spare this useful plant from our greenhouses. For neat, bushy plants and profuse flowering nothing equals *Libonia floribunda*. Small cuttings struck last year and grown along make beautiful winter-blooming plants now. *Chorizema ilicifolia*, with its deep green Holly-like leaves, is one mass of orange-yellow flowers and will blossom freely for several weeks yet. The old favorite *Peristrophe speciosa* still proves useful. The best yellow-flowered plant now in bloom is *Senecio petasites*. Its large terminal panicles are very showy, and a group of these plants make an imposing mass of yellow. *Tetranema Mexicana* makes a charming dwarf pot-plant not more than six inches high. It is not so imposing as some taller plants, but is useful for edging groups on account of its dense corymb of reddish purple flowers. The pretty little Indian Primrose, *Primula floribunda*, is much admired with its small canary-yellow flowers.

Harvard Botanic Garden, Cambridge, Mass.

Robert Cameron.

Vegetable Notes.

FROM this time onward for some months every inch of greenhouse shelf-room ought to be occupied, and the forward-looking vegetable grower must be constantly on the alert, or some seed may be forgotten or neglected so long that a neighboring garden will have the earlier crop. It is a matter of professional pride to prevent any such defeat, and if a diary of gardening operations is kept day by day and year by year, and constantly referred to, there is little danger that any seed will be overlooked. Diaries are helpful in many ways, and most interesting for reference, but every skilled practitioner and first-class amateur keeps them religiously. Sowings of a good many vegetable seeds will be required during the next six weeks. To keep abreast of the times it is well to order some of the novelties most highly recommended in the leading catalogues. Our earliest Cauliflower seedlings are now being transplanted into boxes. They will be shifted into four-inch pots later and transferred to a gentle hot-bed about the middle of March. A good strain of forcing Erfurt we find to be the earliest, but we also grow some Snowball to come in later, for when treated liberally in frames they make good heads of a fine flavor. Seed sown now will make good plants well hardened off by the time they can be planted with safety outdoors. A sowing of Early Wakefield Cabbage is also proper now. We generally make our first sowing of Celery about the middle of February, using Golden Self-blanching and White Plume varieties, the first-named being the most reliable here. Sown at this time, well-blanching heads may be had early in August. Celery in the open ground is keeping extremely well this season; Kalamazoo we find the best variety at present, Boston Market being used during February and March.

Early in February we sow a few early Beets, French Horn Carrots and Radishes in sashes, after putting in about a foot of warm manure. Lettuces sown in December are now being planted in a gentle hot-bed. They require care in ventilating and all possible light. No sashes containing fermenting material from which steam rises should be without a chink for air even in the most severe weather, or the plants will surely damp off. In case of snow, if mats and shutters are allowed to lie on the frames for even two or three days at a time, the seedlings will grow weak and spindling. We are likely to have much severe weather still, but there are few days from this time onward when light and a little air may not be given with safety, although, of course, all frames should be closed early,

so that a little sun-heat may be bottled up on cold afternoons. When it is needed a crack of air can be given before nightfall.

Unless a special house is at command, with a strong supply of bottom-heat, Cucumbers will germinate but slowly, yet a good hot-bed starts them quicker than anything else, but sudden falls in temperature are to be expected for some weeks yet, and it is safer to trust to heated glass houses, at least in this section, until toward the end of February. Tomatoes which we commenced to pick fruit from in October are now getting partially spent, and will be shortly thrown out to make room for another crop. We get the best tomatoes in winter by growing them in pots. By confining the roots we secure warmer soil, and we can feed liberally and surely by top-dressings and liquid stimulants. A sowing made in October now has fruit of good size, some of which will be ripe in three weeks' time. Our best indoor variety last season was Eclipse, a Scotch-raised sort, which gave us remarkably fine bunches, some containing twelve to fourteen fruits each. May's Favorite is also a capital variety. We are trying Comet for the first time, which we saw extensively grown last summer in England and Scotland for market. A pinch of seed sown now will give ripe fruit by June, some weeks before any can be gathered outdoors. Aristocrat is likely to be largely grown outdoors the coming season; it proved remarkably prolific last year; the fruits were smooth and even, and did not crack as most outdoor sorts do.

The present is a suitable time to sow a few small pots of Parsley to come in after the present supply in boxes or cold frames has run to seed. Chappell's Matchless and Champion Mess, curled, are capital sorts. Mushrooms are being more generally grown every year, and few places where there are greenhouses or moderately warm cellars need be without them. Our first bed has now been in bearing for two months and shows signs of exhaustion. A dressing of new loam and a watering of warm water will be given in a few days' time and the bed covered with hay, to induce the starting of a second crop. Usually we have turned over our manure very carefully for some time before spawning, to allow the rank heat to escape, but this winter we decided to try a bed made up with hot manure, mixed with an equal quantity of loam, without turning it over at all. The bed heated very quickly, and was spawned at a temperature of one hundred degrees; mushrooms appeared in just one month from the day of spawning, and they are of very splendid quality, just three weeks ahead of the bed prepared in the regulation manner. The question arises, whether it is necessary to go to all the trouble of shaking up and turning over the manure as we have done in the past, when the less troublesome method gives quicker and better returns. We are trying another bed treated in this way, and have recommended one or two friends to do likewise, and if these turn out successfully I shall abandon the old way altogether. A great many Mushroom failures arise from the manure being either too wet or too cold before the spawn is placed in the beds; we have in the past thought it unsafe to spawn until the heat subsided to eighty-five degrees, or thereabout. This season's experience teaches that it is better to do it while the manure is fifteen degrees warmer.

Taunton, Mass.

W. N. Craig.

Correspondence.

Trees in Public Parks.

To the Editor of GARDEN AND FOREST:

Sir,—It is with sorrow that I am obliged to confess that I never read your editorial of December 23d, 1896, until January 2d, 1897, but, perhaps, it is even now not too late to express appreciation of your vigorous words respecting the all too prevalent feeling that nothing can justify the felling of a tree. Unless this superstition can be put to rout, we may as well attempt no parks or reservations, for if the axe cannot be kept going, Nature will soon reduce the scenery of such domains to a monotony of closely crowded, spindling tree trunks. Among men versed in such matters there is no question about this. Mr. Olmsted and Mr. J. B. Harrison once compiled a pamphlet entitled *Observations on the Treatment of Public Plantations*, in which they printed about forty quotations from the writings of all the highest authorities, from Loudon to Douglas, and all substantially agree with you in saying that in such places "the axe should never be allowed to rest."

But how shall the use of the axe be guided? This is the practical question for park commissioners, and it seems to me that your editorial gives only half an answer. You recommend the employment of "experts in the care of ornamental trees," and experts must, indeed, be engaged at least as teachers

of technical methods. But how shall the experts themselves be guided? Shall they be permitted to reduce the groves and woods of our public domains to collections of specimen trees, or to the monotony of the typical German forests, as, by the way, they surely will do if they are not controlled? In the landscape of a park your arboriculturist, with his zeal for "good" or "ornamental" trees, is almost as dangerous a person as your horticulturist, with his passion for curious, decorative or novel plants. A good park plan is fundamentally a scheme for the creation of more and more pleasing scenery through modifications to be made in the preëxistent vegetation, by clearings, thinnings, plantings and the like; and only secondarily a scheme for making the resulting scenery agreeably accessible by roads and walks. Engineers who direct the building of park roads are expected to conform their work to the requirements of the adopted general plan. Woodmen, foresters and planters should be similarly controlled by the requirements of the same plan—but you do not say so.

Permit me to add that your incidental remarks about the Boston parks (with which I am familiar) strike me as exaggerated. It is true, indeed, that road construction has proceeded more rapidly than planting and woodmen's work, and that some of the older plantations are suffering for lack of thinning. On the other hand, none of the wooded or planted areas of the Boston parks are yet in the deplorable condition of the border plantations of Brooklyn's Prospect Park, which you mention, nor are they likely to reach that condition yet awhile. The Boston Park Commission, influenced largely by a recent mayor, has simply chosen to spend its money in building roads rather than in tree-cutting, pruning and planting; but it has not been forgotten that woodmen's and planters' work is at least as essential to the realization of the general plans as the work of the engineer, and there is good reason to suppose that this work, the postponement of which has as yet done comparatively little harm, will soon be entered on with vigor.

Brookline, Mass.

Charles Eliot.

[The wise thinning of trees in public parks and other pleasure-grounds demands good judgment, which can come only from knowledge and experience; and in the case of public parks it is a particularly delicate operation because, as our correspondent points out, the requirements of the original scheme of the park must, as far as possible, be preserved. No man should be entrusted with the care of ornamental plantations whose idea of a park wood is a collection of specimen trees, or whose understanding of an ornamental forest does not rise above the utilitarian idea of the greatest product from the smallest area. The man who knows park plantations and their requirements will realize that a park wood is beautiful and long-lived in proportion as its trees are healthy, and that different trees require different amounts of light in order to produce the best sylvan results; and the man who knows his business will produce specimen trees where the plan of the park demands them, and from time to time will thin the trees in woods and groves in such a manner and to such an extent that their sylvan character will be maintained. Men capable of directing such work as this can be trained if there is a demand for their services, and if park commissioners are willing to pay them properly for their technical knowledge; but as long as city officers believe that any man who is strong enough to handle an axe or a saw is sufficiently equipped to plant, prune and cut out park and street trees, there is little inducement for intelligent men to fit themselves to manage municipal plantations.]

Our remarks on the condition of the trees in the Boston public parks are certainly not exaggerated, as any one can see for himself who will examine the plantations in Leverett Park, Jamaica Park or Franklin Park, in each of which natural woods or old plantations stood when the land for these parks was taken by the city. These groves and woods had long been neglected and nothing has been done by the city to improve them during the ten or fifteen years of its ownership, and, as we have already said, they are now in bad condition and need immediate and intelligent care. Many old trees which might have been saved ten years ago are now dead or hopelessly ruined, and neglect and deterioration can be seen everywhere. Our correspondent implies that the money available for park construction in Boston has all been spent in road-

building. Large sums of money have certainly been devoted to the construction of park roads, but the Commission has also spent a great deal of money in erecting ugly, and often useless, park buildings and in expensive masonry construction not always necessary and often of doubtful taste. The Commission, too, has for years maintained a large garden establishment which has been actively and successfully engaged in propagating and planting through the parks herbaceous plants, Honeysuckles, Vincas, Japanese Retinosporas, Golden-leaved Junipers and Elders and many other exotic garden shrubs. It is a question of taste which it is not our purpose to discuss now, whether the masses of weedy garden perennials are properly used along the drives of the Fenway and the borders of its salt marshes, or whether Japanese Retinosporas, Golden Elders and yellow Junipers do not strike false notes in the rural landscape sought for in Franklin Park. Such plants may have been wisely selected for their purpose, but it is certainly not good management, when the amount of money for park-planting is limited, to spend a considerable part of it in this way and leave the parkways unprovided with shade-trees, and allow Oaks, Elms, Chestnuts, Hickories and Beeches which have been growing for more than a hundred years, perhaps, to suffer from overcrowding, insufficient nourishment and the attacks of insects. A Retinospora or a Japanese Honeysuckle may attain its greatest usefulness and beauty in the course of a dozen years, but an Oak or a Hickory will increase in beauty for a century, and may in our climate, if it is properly cared for, last for a century longer. If a choice must be made, our plea is for the Oaks and the Hickories against the Retinosporas, Elders, Honeysuckles and all the garden trash in which park makers seem to delight, and against unnecessary stone and mortar when stone and mortar preclude the proper care of the trees.—Ed.]

Pollen-bearing vs. Plant Vigor.

To the Editor of GARDEN AND FOREST:

Sir,—Pollen being generally considered the male element of higher plants is supposed to demand an appreciable portion of the plant's vigor. This hypothesis has gained some credence in the popular mind, and even botanists assume that it is more or less true. Numerous instances of increased vigor and size among emasculated animals are cited to prove that the same principles hold good in the plant world. But this analogy between plants and animals is untenable, since an animal is an individual whose various organs are more or less interdependent, while a plant is a congeries of individuals which are not to the same extent dependent on, but, in a certain sense, at variance with one another. The plant may lose a leaf, a twig, a branch—it may even be destroyed to the root, but life is not necessarily extinct. Under favorable conditions it may spring into renewed activity. The animal, on the contrary, never wholly recovers from the loss of a member, if we leave out of consideration the reproduction of lost parts in some invertebrates, although frequently the other members may acquire an increased development, or enforced inactivity may result in greater size. The loss of one arm in man brings about increased power and dexterity in the other, because of the greater amount and variety of work demanded of it. The loss of reproductive power results in the turning of that energy into other channels, as weight, for example. These principles are supposed to hold in the vegetable world, and on this hypothesis horticulturists base the statement that pistillate strawberries, for example, produce better and more fruit than hermaphrodite varieties, because they do not have the two offices of staminate and pistillate flowers in the same individual.

But, although this theory has gained some currency, there have been no experiments tried, so far as can be learned, to prove it, and it was to test the matter that a series of tests has been conducted by the writer, at Cornell University.

Plants were selected in which the stamens could easily be reached and removed. All were subjected, as far as practicable, to the same conditions of growth—that is, uniform soil, temperature, moisture and light. Plants raised from cuttings were chosen from a large number of one variety, and were as nearly uniform in development as possible. The same care in selection was exercised in the case of seedlings. All shifts

were made simultaneously, and in homogeneous soil. Vegetative conditions, then, being equal, the one factor to be varied was the removal or non-removal of the stamens. One set of plants was allowed to bloom without interference; a second suffered exsection of the stamens in each alternate flower, or, in the case of Geraniums and the like, each alternate truss of bloom was castrated, while all the anthers were removed from the third set. The exsection was performed as soon as fine-pointed tweezers could be inserted into the expanding bud without damage to its perfect development.

At the close of the experiments some of the varieties seemed to have been benefited by the loss of anthers. Most noteworthy of these was *Clarkia pulchella*, in which not only were the emasculated plants more robust and vigorous, but they bore nearly four times as many flowers. On the other hand, some of the plants treated showed little or no effect from the operation. From the experiments thus far made no definite law or laws can be formulated, but from data at hand it seems probable that plants like *Clarkia* and *Geranium*, which have an extended season of bloom, might be aroused to increased effort, while species which have a brief flowering period might show no effect at all, since the plant is practically mature when the flower appears. Further, it is not improbable that plants cultivated for their flowers may show the effect of castration in increased vigor and flower production, while others, like Peppers, might bend their energies toward fruit production. Experiments are still being conducted, and I should be glad to correspond with any one interested in the subject.

Ithaca, N. Y.

Maurice G. Kains.

Recent Publications.

The First Account of Some Western Trees.*—II.

On January 8th, 1806, the party ascended a hill above what is now Nehalem Bay (ii., 749) and found "the mountains covered with a very thick growth of timber, chiefly Pine and Fir, some of which, perfectly sound and solid, rise to the height of 210 feet and are from eight to twelve feet in diameter." The Pine and Fir are referred by Dr. Coues to *Abies grandis* and *Pseudotsuga Douglasii*, perhaps correctly, although *Picea Sitchensis* is common here, and the largest tree on the coast. "The White Cedar, or *Arbor Vitæ*," was seen at the same time, and by Dr. Coues was referred to *Thuja occidentalis*. This tree, which was *Thuja gigantea*, is now almost always called Red Cedar on the north-west coast, the term White Cedar, when used at all, being applied to *Cupressus Lawsoniana*, which does not extend as far north as the territory visited by our travelers. The wood of the *Thuja* (ii., 764) was used by the Indians in making their bows. The "light white pine" used by them for arrows, if it was white pine at all, may have been the wood of *Pinus monticola* or of *Pinus Lambertiana*, but as these trees do not grow in this neighborhood, at least in any quantity, it is more probable that this white pine is the wood of *Picea Sitchensis*. The bark of the Cedar (ii., 768) was used in making hats, which were traded with the whites, and this bark, too, interwoven with Bear-grass (whatever that may be), was closely woven into water-tight baskets (ii., 769). It is from the trunks also of this *Arbor Vitæ* that the canoes used by the Indians of the lower Columbia were made (ii., 770), and such canoes were seen by Lewis and Clark fifty feet long, and capable of carrying twenty to thirty persons.

Chapter xxv., at the beginning of the third volume of this edition, is devoted to a general description of the botany and zoölogy, especially of the region of the lower Columbia, and here are well described a number of the peculiar trees of the north-west coast. A shrub (iii., 828), with a "deep purple berry like the huckleberry, terminates bluntly, and has a cap, or cover, at the end. The shrub rises to the height of six or eight feet, and sometimes grows on high lands, but more frequently on low marshy grounds. The shrub is an evergreen about ten inches in circumference; it divides into many irregular branches; seldom more than one stem springs from one root, although the

* *History of the Expedition under the command of Lewis and Clark.* A new edition by Elliott Coues. In 4 vols. Francis P. Harper. New York, 1893.

shrubs associate very thickly." This plant Dr. Coues refers to *Amelanchier alnifolia*, which he believes becomes semi-evergreen on the Oregon coast. This, however, seems to be a doubtful statement, and wherever we have seen this widely distributed shrub or small tree its leaves are truly deciduous. It was more probably the evergreen *Vaccinium ovatum* than an *Amelanchier* that the travelers tried to describe.

Of the large trees of the coast "the first species grows to an immense size" (iii., 829). "The trunks are very commonly twenty-seven feet in circumference six feet above the earth's surface; they rise to the height of two hundred and thirty feet, one hundred and twenty of that height without a limb. We have often found them thirty-six feet in circumference. One of our party measured one and found it to be forty-two feet in circumference, at a point beyond the reach of an ordinary man. . . . The timber is sound throughout and rives better than any other species; the bark scales off in flakes irregularly round, and of a reddish brown color, particularly the younger growth. . . . The leaf is acerose, one-tenth of an inch in width, three-fourths in length, firm, stiff and acuminate. It is triangular, a little declining, thickly scattered on all sides of the bough, and springs from small triangular pedestals of soft spongy elastic bark at the junction of the boughs." This first species Dr. Coues tells us "is probably *Abies nobilis*, the Red Fir of the Pacific coast." Lewis and Clark, however, probably never ascended the mountains high enough to see *Abies nobilis* or *Abies amabilis* which grow only at considerable altitudes above the sea-level, and their description is an admirable one of the tide-water Spruce, *Picea Sitchensis*, which is the only tree at the mouth of the Columbia which attains the size which they describe. Their second conifer (iii., 830) is correctly referred by Dr. Coues to *Tsuga Mertensiana*. The third species (iii., 831) resembles, they tell us, "in all points the Canadian Balsam Fir. It grows from two and a half to four feet in diameter and rises to the height of eighty or one hundred feet. The leaves are sessile, acerous, one-eighth of an inch in length and one-sixteenth in width, thickly scattered on the twigs, adherent to the three under sides only, gibbous, a little declining, obtusely pointed, soft and flexible. This tree affords, in considerable quantities, a fine, deeply aromatic balsam, resembling the balsam of Canada in taste and appearance. The wood is white and soft." Of this tree Dr. Coues says, "the third species is uncertain, possibly *Thuya gigantea*," but the description points to a Balsam Fir, and evidently to *Abies grandis*, which is the common and only species near the sea-level at the mouth of the Columbia. The fourth species resembles (iii., 831) the second (*Tsuga Mertensiana*) in size. "The bark is of a dark reddish brown, thicker than that of the third species, divided by small longitudinal interstices, not so much magnified as in the second species. In relative position the leaves resemble those of the Balsam Fir, excepting that they are only two-thirds the width and little more than one-half the length, and that the upper disk is not so green and glossy. The wood yields no balsam and but little rosin. The wood is white and tough, though rather porous." This, we suspect, is only a form of the Hemlock, although Dr. Coues believes it to be *Abies grandis*. The absence of balsam would seem, however, to suggest some other genus. The fifth species is probably, as Dr. Coues suggests, the Douglas Spruce, although the thin bark "scaling off in thin rolling flakes" would better apply to *Picea Sitchensis*. The description, however, of the cone of what was believed to be the same tree growing on low marshy ground leaves no doubt of the identity of this last with the Douglas Spruce. The sixth species (ii., 832) "does not differ from what is usually denominated the White Pine in Virginia. The unusual length of the cone seems to constitute the only difference. This is sometimes sixteen or eighteen inches in length and about four in circumference. It grows on the north side of the Columbia, near the ocean." Dr. Coues refers, without hesitation, this tree to *Pinus Lambertiana*, the well-known Sugar Pine. The length of the cone,

if the measurement is correctly given, would certainly point to that tree. No one, however, since the time of Lewis and Clark, so far as we have been able to learn, has ever seen *Pinus Lambertiana* growing north of the Columbia River or north of the Santiam River valley, fully a hundred miles south of the Columbia. *Pinus Monticola*, another White Pine, does grow in the coast region of Washington, but the cones of this tree are rarely more than eight or nine inches in length. The seeds of the Sugar Pine, however, were an important article of food to the Indians of south-western Oregon, and it is not impossible that the cones described by our travelers may have come into possession of some of the Indians on the Columbia River through barter with their southern neighbors, and that Lewis and Clark may have been misled as to the habitat of the trees producing them. At any rate, it hardly seems possible that they could have seen the Sugar Pine.

The seventh and last species (iii., 832), which is described as seldom rising higher than thirty-five feet, with a trunk not more than two and a half to four feet in diameter, is probably a depauperate form of *Picea Sitchensis* to which Dr. Coues has referred it. The tree of the lower Columbia River resembling the Ash, when divested of its foliage (iii., 834), with leaves divided into four deep lobes, is *Acer macrophyllum*, here first described, although a technical description of it was not published until somewhat later. On the same page is the first description, too, of the Vine Maple, *Acer circinatum*. The earliest account of *Sambucus glauca* appears on page 835, where the fruit is well described as pale sky-blue.

In ascending the Columbia on the return journey, on the 4th of April, 1806, the travelers noticed for the first time *Cornus Nuttallii* (ii., 930), and on this day a fallen Fir-tree was seen which, including the stump of about six feet, was 318 feet in length, although its diameter was only three feet. This probably, judging from the small diameter of the trunk in proportion to the height, was *Abies grandis*. Few taller trees have actually been measured in the United States. The Crimson Haw seen on the Walla Walla River on April 30th, 1806 (iii., 979), is probably *Crataegus cocinea*, var. *macracantha*, which would here be near the extreme western limits of its range. The Purple Haw found at the western base of the Bitterroot Mountains (iii., 1041) is referred by Dr. Coues to *Viburnum pauciflorum*. We should have supposed, however, that Purple Haw here means *Crataegus Douglasii*. In the same paragraph there is described "a species of dwarf Pine, ten or twelve feet high, which might be confounded with the young Pine of the long-leaved species, except that the former bears a cone of a globular form, with small scales, and that its leaves are in fascicles of twos, resembling in length and appearance those of the common Pitch Pine." This undoubtedly is another reference to the Lodge Pole Pine, *Pinus contorta*.

On June 15th (iii., 1043), the party, then ascending the upper Clearwater to cross the Bitterroot range, found a "thick growth of Long-leaved Pine, with some Pitch Pine, Larch, White Pine, White Cedar, or Arbor Vitæ, of large size, and a variety of Firs." The Long-leaved Pine here is *Pinus ponderosa*, the Pitch Pine is *Pinus contorta*, the Larch is *Larix occidentalis*, which here first makes its appearance in literature, although it was not described until 1849; the White Pine is *Pinus flexilis*, and the White Cedar, or Arbor Vitæ, again referred by Dr. Coues to *Thuya occidentalis*, is *Thuya gigantea*. The Firs are *Abies grandis* at low elevations, and near the summit of the mountain *Abies lasiocarpa*, these being the only Fir-trees of these forests. The Larch is mentioned again on page 1066 as confined with the Firs to the higher parts of the hills, "while the Long-leaved Pine grows as well in the river-bottoms as on the hills." The Cottonwood mentioned here, "with a wider leaf than that of the upper part of the Missouri, though narrower than that which grows lower down the river," is probably *Populus angustifolia*, a species which varies considerably in the width of the leaves.

On the 25th of July, 1806, Captain Lewis, having recrossed

the continental divide through the low pass which has since borne the names of our explorers, noticed east of the mountains on Maria River (iii., 1097) "three species of Cottonwood, the narrow-leaved, the broad-leaved and the species known to the Columbia, though here seen for the first time on the Missouri." This third species was, no doubt, our eastern *Populus balsamifera*, and not the Pacific coast *Populus tricarpha*, which has not been noticed, we believe, on this side of the Rocky Mountains.

This is the last interesting entry in these journals relating to trees. The two parties into which the expedition had been separated, before it recrossed the continental divide, were now speedily reunited near the mouth of the Yellowstone River, and, rapidly descending the Missouri, were soon surrounded by the familiar trees of the Atlantic forests.

C. S. S.

Notes.

As in many other garden flowers, great improvements have been made of late years in the *Mimulus*, or Monkey-flower, and now seed of such good strains can be had that it is worth while to sow them even in small gardens where flowers are wanted for cutting. The fine seed should be sown rather evenly in cold frames, and they will give an abundance of rich-colored flowers for a long period from midsummer on.

Mr. John E. Lager, of Summit, New Jersey, who is collecting Orchids in the United States of Colombia, states in the *Florists' Exchange* that the plants are becoming scarce, not only on account of the constant drain upon them for export, but because large tracts of forest are being cut down to make room for Coffee plantations. The belt in which the Coffee-plant thrives ranges from 2,000 to 7,000 feet above the sea-level, and very few garden species of Orchids are found above or below it.

The most beautiful trays and cabinets which come from Japan are made of the dark, irregularly grained and wavy-lined wood of the Keaki-tree, *Zelkova Keaki*, once classified by botanists as a *Planera* and closely allied to the Elm. Many of the trays are ornamented with the bark of a species of *Pterocarya*, the eastern representative of our Hickory. This bark is apparently flattened and cut into thin sheets which show attractive concentric markings of dark brown on a lighter ground.

Mr. S. D. Willard, at the meeting of the Ohio State Horticultural Society, spoke of an interesting experiment tried at Geneva last year. An orchard of Greening, Baldwin and Hubbardston Apples was thinned on some of the rows so that an apple was left every four inches, and on others so that there was only an apple for every six inches. On the trees where no thinning whatever was done the apples were small and hardly colored; the apples on the trees thinned to four inches apart were colored well and of fair size, but no buds formed for the next season. On trees thinned to fruit six inches apart the apples were large and so finely colored as to attract the attention of passers on the road several rods away. Besides, this there were well-grown fruit-buds for next year, so that, if nothing prevents, the trees will bear two seasons in succession.

The current issue of the London *Garden* has a colored plate of the old Tea Rose, Madame Charles, as it is grown at Gravetye Manor, and Mr. Robinson, who has tried it in his Rose garden for years, has found nothing more satisfactory or constant than this hardy, patient bloomer with its beautiful buds of exquisite color. This Rose was sent out in 1864, having been raised from seed of Safrano, and it resembles Madame Falcot, which is also from the same parent, but of a feeble growth. The flower is of an apricot color, without the saffron tinge found in Safrano. It is a free grower and has a half-climbing habit, which makes it an excellent variety for the greenhouse in the winter. It is a Rose rarely seen in America, but we remember one plant of it which lived many years on Staten Island with a protection of some burlaps tied about it in the winter, against which coarse manure was piled to the height of some eighteen inches and covering a circle with a radius of two or three feet.

In Farmers' Bulletin No. 45, Mr. F. H. Chittenden, Assistant Entomologist of the Department of Agriculture, gives many interesting facts about the nature and extent of the damage to stored grain caused by insects. Aside from the loss in weight brought about by the ravages of insects, the infested grain is often unfit for human consumption and has been known to cause

serious illness. It is also undesirable for live stock and for seed. Most of our indoor insects are indigenous to the tropics and do not thrive in the cold climate of our northern states, but in the south they have become acclimated, and there they do the greatest damage. It is said that in the state of Texas nearly half the grain is actually destroyed by weevils and rats. The loss to the corn crop in Alabama in 1893 was more than a million and a half dollars. There are seven other states which are subject to the same climatic influences as Alabama, and if we estimate the annual loss at the same percentage we would have a total destruction of nearly twenty millions of dollars in the item of corn alone, while other grains and mill products suffer correspondingly. We have no space to give descriptions of the many weevils, grain moths, flour moths, flour beetles, meal worms and grain beetles which do this injury, or to give anything like a summary of the remedies and preventives advocated. It may be stated in a general way that bisulphide of carbon is the best known remedy against all insects which affect stored products, and for this purpose it is becoming indispensable to the owners of mills and granaries. The vapor of this substance is deadly to all forms of animal life if inhaled in sufficient quantity, and mills and other buildings can be easily fumigated with it.

Besides the large assortments of choice fresh and dried fruits, the displays of preserved fruits in first-class fruit and grocery stores are a surprise in their range and variety. Strawberries, raspberries, red and white cherries, blood peaches and apricots, from Wiesbaden, Germany, are among the handsomest preserves. These rich sweetmeats come in glass, as do many preserved fruits from England and this country. With blackberries, pears, pineapples, quinces and other generally used fruits, there are preserved citron, crab-apples, figs, gooseberries, limes, sweet oranges and tamarinds. A large selection may be made from the less syrupy "canned" fruits in tins, as also in glass, including cranberries, green-gages and many other varieties of plums. Sweet pickled fruits are highly esteemed, and yet more costly are fruits in brandy. These choice specialties are carefully prepared in good brandy by experts selected by the first-class grocers. The brandy is supplied by the firm to insure its uniform quality. Other fruit preparations are jellies, jams and marmalades, and shelves of these smaller packages in plain and fluted tumblers and in white pots include many foreign and native products of really choice quality at remarkably low prices. Cherries in Maraschino, figs in eau-de-vie and in cordial, marrons in brandy and marrons glacés in vanilla syrup, guava syrup and many syrups of domestic fruits, and lime and grape juice give some idea of the variety of treatment in the way of preserving and serving fruits. Extracts for flavoring are another manufactured product of fruits. Bar-le-duc, a French compote of white currants in syrup, is one of the choicest tidbits, and a club-house favorite as a relish with cream cheese. A small glass costs forty cents. The petals of preserved Smyrna roses prove a delicately perfumed and delicious morsel, a small tin costing fifty cents. Canton stem ginger and Kumquat oranges come from China in stone pots, and from India lemon and tamarind syrups, pineapple and mango preserves and marmalades, and guava jelly and guava cheese, besides chowchow of mixed fruits. Among India relishes, mangoes, tamarinds and lemons appear. Pickled products further extend the use of fruits in such delicacies as young walnuts and olives, the latter in great variety of color and form and size.

William Elliott, who nearly forty years ago inaugurated the business of selling plants at auction in this country, and who for a still longer time was one of the leading seedsmen of the country, died on the 16th of January at his home in this city. Mr. Elliott's ancestors for several generations had been gardeners in Scotland, where he was born in 1824. After passing an apprenticeship in the gardens of the Earl of Minto he was employed by Sir John Trevelyan, and Sir William Ingleby, at Ripley Castle, Yorkshire, and afterward in the nurseries about London, and came to this country in 1851. He was employed by Andrew Reid, a Broadway florist, and three years later established the well-known firm of Young & Elliott, on John Street, which is still in existence under the name of William Elliott & Sons. Mr. Elliott was as well known for his kind heart and upright character as for his bluff ways and his ready, though somewhat caustic, wit. He was a man of sturdy constitution, commanding appearance and marked individuality of character. His alertness of mind, his penetrating voice, his fine physical proportions and aggressive manner made him singularly successful in his special business, and for many years he was one of the most prominent figures in the commercial horticulture of this country.

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The Redwoods—a Suggestion.

EVERY one who knows California knows the beauty of the Redwood forest and the value of Redwood lumber, and all Americans should know that the Redwood forest is the richest and most important coniferous forest in the world. It stretches in a maritime belt from the borders of Oregon on the north for several hundred miles southward to the southern confines of Monterey County, California. It is not wide, as the Redwood does not flourish beyond the influences of sea-fogs or ascend to greater altitudes than 3,000 feet. It is unusual, therefore, to find these trees more than thirty miles from the coast; and they grow to the greatest perfection on the banks of streams and the slopes of low cañons facing the sea. Sometimes, especially at the north, the Redwoods form pure forests, their tall shafts standing close together in such dense phalanxes that only Ferns can grow in the perpetual shadow of their spire-like heads; and sometimes they are mingled with Spruces, Firs and Cedars in more open forests which are the favorite home of the Tan Bark Oak. No other forest of conifers is so sublime, and no other forest is so productive. The productiveness of these forests is almost incredible. Fifty thousand feet, board measure, of lumber have been frequently cut from one Redwood trunk, and single acres have produced 1,000,000 feet of lumber, or the yield of some 250 acres of the rich pineries of the south-Atlantic and Gulf states.

Surpassed in bulk of stem only by the Sequoia of the Sierras and in height* by some of the Australian Eucalypti, the Redwood is without a rival in stately beauty; and the Redwood forest is one of the wonders of the world, and man in his short-sightedness is going to destroy it. Redwood lumber, which is the best building material in the Pacific states, is valuable for innumerable purposes, and the Redwood forests are melting away as fast as human energy, aided by steam and the most perfect machinery, can destroy them. Already this wonder of the world, this great national possession, has passed from the control of the Government into the hands of lumbermen and speculators, and the story of this transaction is not always a

pleasant one. The title to land covered with Redwood trees has sometimes been acquired honestly, but a considerable part of this great timber belt has undoubtedly been stolen from the Government by means of dishonest entries, made possible by the defective and foolish land laws of the United States and the dishonesty of its civil officers; and now it is impossible to find between Smith River and Punta Gorda a single entire section of Redwood forest controlled by the Government. Nor has the Government secured anything like a fair money value for this priceless possession, Redwood land having all been sold at prices varying from \$1.50 to \$2.50 an acre; and the nation's loss from its bad management of this narrow stretch of the public domain alone cannot be less than \$100,000,000. Fortunately, there still remain in the hands of lumbermen vast stores of Redwood timber, and, unless the construction of a ship canal across the Isthmus widens the demand for Redwood lumber in the eastern states and Europe, many years will pass before the Redwood forests are finally destroyed. The Redwood, too, is fortunately possessed of a surprising vitality which enables it to keep up a brave fight against its human enemies. Cut down it springs up again with many vigorous shoots from the stump, and some of these shoots from trees cut near San Francisco forty years ago are already a hundred feet high and promise to grow to a great size. The fires which lumbermen set to clear away the debris of branches and bark before they are able to cut the trunks into lengths suitable for handling, carry desolation in their path, but do not destroy the vitality of the Redwood stumps, which, before a year has passed, are clothed with vigorous shoots. These first operations of the lumberman, reckless and extravagant as they are, do not utterly destroy the forest, which, if it could now be left to itself, would in time recuperate. But the land which bears these great trees will produce crops of grass, and this stretch of the California coast is the best dairy region in the state, so that when the logs have been hauled away to the mill, the ground between the stumps is usually roughly plowed and planted with Grass seed; every Redwood shoot is destroyed as fast as it appears, and at the end of three or four years the reproductive power of the roots is destroyed.

As we have said already, the supply of Redwood lumber is so great that, under existing conditions, it will last for many years, but this forest is the property of individuals who have acquired it for what they can make out of it. Its length of life, therefore, will be dependent on the exigencies of commerce. For purposes of local taxation, land covered with Redwood is valued at something like its market value, and to save the payment of these taxes timber is sacrificed in a ruinous competition which destroys without adequate return. It must be evident, then, that the Redwood forest in its primeval splendor is doomed, and that, sooner or later, the time will come when it will be represented by only a few tattered remnants of its former glory. With it will pass one of the marvels of the world as stupendous in its way as any of the scenic wonders which Americans now count among their great treasures. The wisdom of the nation has set aside for all time a great stretch of the Sequoias of the Sierras that future generations of men may know these trees, but no provision has been made for preserving any part of the Redwood forest for a similar purpose, although one Sequoia forest is as important and interesting as the other, and both are equally wonders of vegetable life. Twenty-five years ago, before lumbermen had learned the value and location of these forests, and the ease with which they could be secured, Congress, without expending a dollar, might have made a great national Redwood park in which all the beauties of this forest might have been preserved forever, but this opportunity is lost. The expenditure at this time, however, of half a million dollars, either by the nation, the state of California or by some rich man or group of rich men anxious to do a great public service, would even now buy enough Redwood-covered land somewhere north of Cape Mende-

* See page 42 of this issue.

cino to secure a park large enough to preserve the features of this forest. Could this be accomplished—and all that is needed to bring it about is the banding together of a few men and women zealous for this particular cause—the time would come after these great forests have disappeared when such a Redwood park would be one of the most interesting and instructive sights in the world and one of the glories of the United States. To those who have wandered among these mighty trees built up by the slow growth of centuries and felt the inspiration of their solemn beauty, the destruction of the Redwood forests seems to be a sacrilege which never should have been allowed, and, certainly, if some small part of it is not preserved, a great wrong will be done to the world, which will lose, with the passing of the Redwoods, one of its fairest possessions.

The Height of the Redwood (*Sequoia sempervirens*).

IT has usually been considered by the students of our trees that the Sierra Sequoia was the tallest, as it is the largest, tree in North America. Three individuals, each 325 feet high, have been measured in the Calaveras Grove; and these, so far as I have been able to learn, are the tallest American trees whose heights have been authoritatively recorded. On the 7th of last September, however, General Henry L. Abbot, Mr. John Muir and I were on Eel River, near the lumber-camp at Scotia, California, and measured a Redwood which had lately been felled, and which led us to suppose that this species grows to a much greater height than any other American tree. This particular individual was only 662 years old, with a trunk diameter of ten feet five inches at six feet above the ground, and of nine feet fifteen feet above the ground; it measured 230 feet to the first limb, where the trunk was two feet nine inches in diameter and 340 feet to the top of the stem. In trunk diameter it was smaller than the average size of the trees in this particular forest, which extends without a break for about twenty miles along both banks of the Eel River; its height was not exceptional and may be taken as the average height of the trees in this forest; and the men in this camp who pass their lives in working among these trees were confident that individuals one hundred feet taller than the tree we measured could be found. This, perhaps, is not improbable, as Redwood trunks from fifteen to twenty feet in diameter are not rare, and occasional trees with trunks from twenty-two to twenty-five feet in diameter can be found. Judging by the fact that the Eel River trees, which had grown in a deep alluvial deposit, had only attained a diameter of ten feet five inches in 662 years, some large Redwoods must have lived through several centuries and reached a much greater height.

Of other trees measured in this forest one was forty-three feet in circumference at five feet above the ground; another was forty-five feet in circumference at the same height, and another fifty-two feet five inches. The trunk of another measured four feet three inches in diameter 180 feet above the ground.

C. S. S.

Notes of Mexican Travel.—XII.

MY SUMMER IN THE VALLEY OF MEXICO.—II.

THE Pacific slope of the Serrania de Ajusco is likewise of volcanic character. About six miles east from Cuernavaca, at its foot, a stream of lava two miles wide ran down over the valley. Here, at an elevation of but 5,000 feet, prevail different climatic conditions from those of the Valley of Mexico; hence we find these lava-beds occupied by a subtropical forest with trees of considerable size, and in this shelter find shrubs and herbs which are the denizens of warm lowlands. On several trips to Cuernavaca at intervals throughout the summer I could not fail to explore these lava-beds, and I was always repaid by numbers of interesting plants. One of the most showy of these by reason of its clustered stems, three or four feet tall, termi-

nating in racemes of scarlet flowers, a truly striking plant, was a *Lamoureauxia* of recent discovery, *L. Nelsoni*, Rob. & Greum. The deep-wooded and wet barranca leading from near the town up into the heart of the mountains continued to be an attraction on these visits to Cuernavaca and to yield, as last year, new species, among which I may mention a second species of *Coulterophytum*.

When I arrived in Mexico City at the end of May the hillsides in view in all directions were still brown, and it was not till the middle of July that the tardy rains brought out their verdure, consequently my attention was given during the earlier weeks of the season to such plants as grew about the wet meadows and the canals draining them. Following up my quest of these, we went one day by train of the Interoceanic Railroad to Ayotla, about forty miles south-east of the city, and situated, according to the map, on the north shore of Lake Chalco. We found, instead of a lake, only a grassy and reedy savanna, all the better, however, as a field for botanizing. On our way we passed extensive drainage works designed to convey the summer floods of Lake Chalco directly into Lake Texcoco. A few weeks later the opening of the canal was celebrated by a banquet, dignified by the presence of the President of the Republic. When the great drainage tunnel below Lake Texcoco shall be completed, nearly all the lakes of the valley will disappear, and in their places will stretch green pastures and fat fields of tillage. Lake Texcoco offers little of interest to the botanist, and presents no beauty, except when viewed from a distance. Surrounded by alkali flats, which are thinly covered with salt grasses and the few other plants common in such conditions, shrinking low during most of the year within margins of whitened mud, it is the great sink of all the valley.

In strong contrast with all this, however, is Lake Xochimilco, which lies close by the base of the southern hills and is fed by sweet mountain springs. It is separated from Lake Texcoco by the Hill of the Star and a row of volcanoes which are truncated cones, but discharges its waters into that lake by the Viga canal leading through the city. Lake Xochimilco is now but a shallow lake; indeed, as we look over its surface from the Hill of the Star, we see only a green expanse of sedges and reeds, except where its waters are led through artificial ways. On its southern border, hidden under trees except as to the domes and roofs of its few venerable churches, stands the Aztec town from which the lake takes its name. Two routes lead to Xochimilco town, one by boat through the Viga direct from Mexico City, the other by train to Tlalpam, thence on foot or in saddle five miles eastward, at first over an arenal or tract of volcanic sand, which yields its peculiar plants, and finally over a stone causeway lined on both sides by the fastigiated Willows commonly set on the banks of canals throughout the valley. Xochimilco may be called an Aztec Venice. Canals lead in all directions, and bronzed and bare-limbed Indians, the men and boys in white cotton and the women in blue scarfs and scarlet skirts, are deftly propelling their canoes or scows by means of poles and paddles. To this point are brought for shipment to the great city in scows all the products of the mountains to the south, and even from the tropic valleys below Cuernavaca, products of forest, field and village. If it is a market day, we find the town thronged with the Indians from many villages around. The streets and broad plaza are bright with crowds in clean, many-hued attire, and we see much manly beauty to admire, and confess the comeliness of many of these brown Indian maidens and matrons. Their wares in endless variety, products of rude handicraft, with grains, vegetables and fruits, fill the market space and are spread out in the shade of the broad Ash-trees of the plaza.

The lower part of the town is extended over the lake bottom. Here, as for a wide space outside, a network of canals has been dug. With the black humus from these, plats of land, irregular in form and varying in size from a rood to an acre or more, have been built up. These are

held together by the roots of Willows set on their margins, those singularly prim Willows which cast but little shade. As they are of richest soil and are easily watered by splashing or dipping water from the surrounding canals they are kept in constant cultivation and to their fullest capacity. Besides luxuriant crops of corn, garden vegetables of all kinds and choice flowers are grown here for the city markets. On many of the nearer of these plats stand by the water's edge, with canoes drawn up the banks before them, the pretty huts of the owners, the walls of which may be formed of the canes of *Arundo* neatly fastened in line, the thatch formed of its leaves or of marsh grass. Mere basket houses are these, yet they suffice for the simple needs of these happy children of nature. On several visits to these strange scenes we engaged Indians with their boats to convey us through the maze of canals to those more remote in pursuit of water plants or marsh plants. Besides the yellow-flowered *Nymphæa Mexicana*, a white-flowered one was common in still water, presumably *N. tussilagi-folia*, Lehm. The flowers of the latter are carefully gathered and appear in great abundance in the flower markets of the city throughout most of the summer. Far more multiplied than these was *Eichornia crassipes*, Knuth, with lovely bluish flowers, of which sheets of blooming plants completely covered the surface of certain coves. The flowers of this plant being too delicate to bear handling like Water-lilies, the entire plant, carefully set in pots or baskets, is carried to town for sale. Along the banks of the canals stood the most stately and showy of Golden-rods, *Solidago paniculata*, DC.

As for the snowy mountains on the south-east rim of the valley, Iztaccihuatl and Popocatepetl, they were not to be included in the field of a single season. I only looked up at them on an autumn day from underneath the sombre giant Cypresses which crown the Holy Hill of Amecameca, scanning with somewhat of awe their vast slopes, cragged and furrowed indescribably.

After the middle of October the rainy season drew to a close. With the drying of the soil and the less interrupted sunshine most plants hastened to maturity and decay. A few, chiefly half shrubs, were making slow preparations for blooming in winter, according to their habit. I could not linger for these, since he who collects in botany must distribute also. So, on the morning of the 8th of November, I was compelled to turn from the valley which had yielded me so much pure delight, from its charm so difficult to define, to travel under skies growing leaden into our drear northern winter.

Charlotte, Vt.

C. G. Pringle.

Lilium Humboldtii and Allied Species.

THE typical *Lilium Humboldtii* has a large ovoid bulb, more or less oblique, and occasionally prolonged laterally in a semi-rhizomatous manner. The scales are thick and the bulb very compact. In height the stem is often above four feet. I have seen it nine feet high, and in one instance a single stalk bore eighty buds. Ten or fifteen flowers in a panicle are common. The lower pedicels are longer, and growing gradually shorter form a broadly conical panicle. The flowers are large and of much substance, of a uniform rich reddish orange spotted with maroon and strongly reflexed. Nature has provided for the weight of the great panicles by giving this Lily a very stout erect stem, which is well furnished with leaves in full whorls.

In its native home in the foot-hills of the main Sierra Nevada, *Lilium Humboldtii* usually follows the belt of Yellow Pine, *Pinus ponderosa*, and grows in the open woods. It does not often grow above the four thousand-foot line, nor on the lower foot-hills. Just how far north it extends I have never been able to learn. I know of it in Tehama County, California, but have never seen nor heard of it in the Mount Shasta region. It has never been reliably reported from any point in the northern Coast Range of California, although I have recently learned of a Lily in Humboldt County which can only be *L. Hum-*

boldtii or an unnamed species. Neither have I been able to learn of this Lily in the foot-hills of the lower San Joaquin valley, nor farther south than the Yosemite road. Generally it is strictly a mountain species, but there is one notable exception in the upper Sacramento valley. Some fifteen years ago it grew sparsely at one location in the Oak forest which borders the river. It is now abundant for twelve or fifteen miles along the river. In El Dorado County I saw it flowering to perfection last June. A fire had gone through some second-growth Pines a year or two before, and the magnificent panicles made a gorgeous display high above the Ferns and weeds. The top of the hill had been cleared some years before and was cultivated in grass and grain, but in the new stubble many stubs of the Lily stalks could be seen, and from wounds made by the plow the bulbs had been broken into groups of from two or three to a dozen bulbs. The Lilies are evidently on the increase under the conditions, and the bulbs were very healthy. As a cultural hint I would say that *L. Humboldtii* always grows on well-drained soil. The subsoil is usually rocky, the upper soil clayey or volcanic.

In southern California there are two other strongly marked types of *Lilium Humboldtii*. Of these *L. Humboldtii*, var. *magnificum*, is nearest the northern form. This superb Lily has a large bulb, which is usually broader and rounder than in the type, and which speedily turns purple on exposure to the air. At its best it is even sturdier in growth than the type. The foliage is similar, dark green and glossy; the stem is much darker. The flowers, while of the same form and borne in a similar deltoid panicle, are differently colored. At the middle of the flower the ground-color is a rich orange-red. The maroon spots are surrounded by a reddish circle. On the upper half the reddish circles become larger, until they merge into each other at points, making an irregular combination of dark maroon spots, red ocellations, and of dark reddish orange ground in blotches. This form of *L. Humboldtii* is found in the San Bernardino Mountains which make the southern end of the Sierra Nevada, in the Coast Range, as far north as Santa Barbara, in the Jacinto Mountains, and on some of the islands off the coast of southern California. There are some variations within this range, but I am satisfied that bulbs from all of these localities grown side by side would prove practically identical. From the cultivator's standpoint it is important to observe that while the *L. Humboldtii* of the northern Sierra seldom, if ever, flowers the first year, an ordinary bulb of the variety *magnificum* will bloom well the year it is planted, while even small bulbs of *L. Bloomerianum* almost always do. My information is that the variety *magnificum* usually grows in the deep débris near the streams in shaded mountain cañons.

Lilium Bloomerianum is to the variety *magnificum* as a pigmy to a giant. Two or three feet usually measures its slender pale stem, and it is sparsely flowered. The much smaller flowers have a paler orange ground and are not so richly colored. The ocellations and red-blotched apex of segments are the same. The bulbs are small, not averaging one-fourth the size of those of the other forms. I have referred before to the peculiar two or three jointed scales. I have seen bulbs in which nearly all of the upper joints readily rubbed off, leaving a mere stub of a bulb. *L. Bloomerianum* is found in the Pine belt of the high mountains of San Diego County.

The following figures, showing the average size of flowering bulbs of the forms of *Lilium Humboldtii*, may be of interest to some: In 750 bulbs of the typical *L. Humboldtii* 196 were from 9 to 12 inches in circumference, 351 from 8 to 9 inches in circumference, and 203 from 7 to 8 inches. The latter averaged $3\frac{3}{4}$ ounces in weight; second size, $4\frac{3}{4}$ ounces, and largest size, 9 ounces, with a few 14 ounces in weight. Bulbs of *L. Humboldtii*, var. *magnificum*, measure about the same, excepting that a few exceed these measurements.

Large bulbs of *Lilium Bloomerianum* will measure 6 inches in circumference and weigh $2\frac{3}{4}$ ounces. Very

many flowering bulbs measure 3 to 4 inches and weigh 1 ounce each.

Lilium Columbianum grows over a wide range of country and in many situations. It is found in Oregon from the coast line and the mouth of the Columbia River, throughout the Coast Range and in the lower portions of the Cascade Mountains. It reaches north-eastern California in Modoc County, and in the state of Washington is found in the southern part in about the same range as in Oregon. I have no accurate information as to how far it extends on Puget Sound, but it follows the Columbia River valley and is found in various portions of north-eastern Oregon, and is close to the Idaho line, to my knowledge. It prefers a sandy, well-drained soil among Ferns in open woods. It is easily grown in cultivation. *L. Columbianum* may be described as a miniature *L. Humboldtii*. The flower has reflexed orange-red segments, finely dotted. The stem is slender, and both it and the leaves are light green. The bulb is compact and ovoid, as in *L. Humboldtii*, but, unlike the latter, the scales are thin. Five hundred average bulbs measure as follows: 100, 4 to 5¼ inches in circumference, ¾ ounce each; 346, 3 to 3½ inches in circumference, ⅓ ounce; 54, 2¼ inches in circumference, ¼ ounce. *L. Columbianum* grows from 1½ to 4 feet in height, and usually flowers the first year. I find sandy alluvium best answers its needs.

The bulbs of *Lilium Bolanderi* are almost identical with those of *L. Columbianum*. I have not flowered *L. Bolanderi* nor have I seen it in flower. It is described as being from six inches to three feet high and few-flowered. The leaves are whorled and the general habit seems to be similar to that of *L. Columbianum*. The flowers are, however, quite different; the segments are not reflexed, and the flower would seem to be broadly trumpet or bell shaped and nodding. A collector who saw it in full flower this year describes it as a very handsome flower of a pleasing red and growing in a high mountainous region in a soil of rocky debris and leaf-mold. Habitat indefinite, Humboldt and Del Norte counties, in north-western California.

In this group will fall a fourth species of the far north, related to *Lilium Columbianum*, and as yet unnamed. In this species the habit of *L. Columbianum* in bulb and leaf is combined with a peculiar-shaped flower. The lower half of the segments forms a closely constricted tube, from which the upper portion spreads horizontally in a rotate flower finely dotted with maroon. This species is nearly as fragrant as *L. Parryi*.

Utah, Calif.

Carl Purdy.

New or Little-known Plants.

Tillandsia Dugesii.

A VERY beautiful *Tillandsia* has recently been received at the Gray Herbarium of Harvard University from central Mexico. The plant was collected in the mountains of Santa Rosa, Guanajuato, by Professor Alfredo Dugès, and it proves to be the rare *Tillandsia Dugesii*, described ten years ago by Mr. J. G. Baker.* Though Mr. Faxon's drawing (see page 45 of this issue) does not reproduce the delicate coloring of the plant it gives a good idea of its habit. The leaves are two feet long or more, densely rosulate, with narrowly ovate bases from four to six inches long and from two to two and a half inches wide, tapering to the elongated rigidly coriaceous ensiform-setaceous upper portion, which is convolute nearly to the tip. The leaves throughout are glaucous, with minute lepidate dots. The peduncle is much shorter than the leaves and is closely sheathed by bracts. The lower bracts are as long as the leaves, and like them are lepidate, but their bases are glossy and crimson. The bracts of the panicle are smaller and shorter, and toward the top of the panicle they become merely ovate with acuminate tips. The panicle is a foot or more long, consisting of from fifteen to thirty spikes, these spikes being about three inches long and

scarcely an inch broad. The rachis is crimson and glossy. The flower bracts are one to one and a half inches long, ovate, acute, and strongly keeled on the back; they are either very sparingly lepidate or quite smooth, and of a peculiar greenish straw-color, shading to rose. The calyx is an inch long, composed of three lanceolate-acute conduplicate sepals with sharp keels. The corolla is about half an inch longer than the calyx, and apparently deep purple, with ovate-lanceolate obtuse blades. The stamens are a little shorter than the corolla. Mr. Baker described this species from a plant with neither corolla nor fruit, and as yet the fruit is unknown. The very long glaucous foliage and the brilliant peduncle and rachis make it a plant worthy a place in the greenhouse, and, though the specimen at hand is somewhat wilted, Mr. Cameron will attempt to grow it in the Botanic Garden.

Gray Herbarium, Cambridge, Mass.

Merritt L. Fernald.

Foreign Correspondence.

London Letter.

CHRYSANTHEMUM NIPPONICUM.—This is a Japanese plant of considerable promise. It is closely related to the European Ox-eye Daisy, *Chrysanthemum leucanthemum*; indeed, it is catalogued by the Japanese nurserymen as *Leucanthemum Nipponicum*. Although described by Franchet in 1872 from specimens collected in Nippon by Savatier, it does not appear to have attracted the attention of European cultivators until 1895, when Messrs. Dammann & Co., of Naples, sent it out as a new plant. It is a perennial shrub about two feet high, with numerous annual stems not unlike those of the common *Chrysanthemum*, oblong toothed leaves, and numerous erect axillary scapes bearing each a head three inches across, with a large yellow turbinate disk and broad, overlapping, pure white ray florets. A German horticulturist speaks highly of it as a winter-flowering plant for the greenhouse. The cuttings are struck in April, and the plants treated as for the ordinary *Chrysanthemum*, housing them in the autumn to flower in December and January.

HYBRID CINERARIAS.—Various crosses between distinct species of *Cineraria* have been made in England recently, and the results obtained are most gratifying. The most recent cross has been obtained by Mr. Lynch, Curator of the Botanic Gardens, Cambridge, who crossed *C. multiflora*, a native of the Canary Islands, figured in *The Botanical Magazine*, t. 4994, as *Doronicum Bourgasi*, with forms of the common *Cineraria*, supposed to be a garden evolution from *C. cruenta*, also a native of the Canary Islands. The first named has tall stems three to four feet high, with large orbicular leaves, the lower petiolate portion bearing lobelike leaflets and large auricular clasping bases; the flowers are of a uniform soft mauve color, about an inch in diameter, and borne in very large sheaf-like clusters. The hybrids are mostly like *C. multiflora* in habit, but shorter, while the flowers are much larger and show variations in color similar to those of the other parent. Mr. Lynch showed his hybrids at the last meeting of the Royal Horticultural Society, where they attracted considerable attention. A remarkable circumstance in relation to these hybrids is that Mr. Lynch did not take any steps to prevent self-fertilization beyond covering the heads intended to be pollinated with muslin, in order to exclude insects. He says no further precaution, judging by results, appears to have been necessary. In no case was any true *C. multiflora* obtained from the seed saved, and therefore it may be assumed that this species is sterile to its own pollen, or, at any rate, pollen from another species was more effective. One of the best of the hybrids, named *C. Lynchii*, is remarkable for its numerous flowers in large loose heads and uniformly colored a most pleasing shade of bright rose-mauve, not the harsh mauve so prevalent in the garden *Cineraria*. It grows to a height of about three feet, and is therefore effective in the same way as *C. cruenta*, the type

* *Journ. Bot.*, 1887, p. 278.

Fig. 7.—*Tillandsia Dugesii*.—See page 44.

1. Plant, about one-fourth natural size. 2. Upper portion of inflorescence, natural size. 3. A flower, natural size. 4. A petal, natural size.

which at Kew is a most useful decorative plant for the conservatory.

Polygonum Baldschuanicum.—I drew attention to this plant a few weeks ago when it was an attraction in the herbaceous collection at Kew. Some additional informa-

tion is now published in *The Gardeners' Chronicle*, along with a reproduction of a photograph of a fine specimen of it grown by Monsieur Lemoine, of Nancy, with whom it has grown exceptionally well, planted at the foot of a dead Elm-tree, up which it climbed to a height of ten feet and

covered the lower branches with its twining stems, which bore all the summer multitudes of panicles of white flowers. This was its behavior at Kew, where, however, it was planted to scramble over a sheaf of "pea-rods." It is a hardy perennial with wiry stems, cordate deciduous leaves and *Spiraea*-like panicles of flowers. It is a native of Turkestan at an altitude of from four to five thousand feet, where it was found and introduced by Dr. Regel in 1882. It obtained a first-class certificate from the Société Nationale d'Horticulture de France in September, 1894.

CYCLAMEN PERSICUM.—An interesting sport from the Persian *Cyclamen* was exhibited this week by Monsieur de Langhe, Brussels, under the name of *C. Papilio*. It differed from the usual form in having the segments of the flowers spreading horizontally instead of being perpendicularly reflexed, and in the margins being crisped and undulated. Six named forms were shown and they differed from each other in size, color and degree of crispness. Although quite distinct from any other hitherto known sport they were considered inferior in decorative value to the normal form, of which some remarkably fine examples were shown by Major Joicey, of Ascot. At the preceding meeting of the Royal Horticultural Society, Messrs. H. Low & Co. exhibited a sport with a curious feather-like secondary segment growing crest-like from the middle of the normal segment. This character is reproduced in the majority of the seedlings obtained from seeds saved from these feather-crested forms. It will be interesting to watch the development of these two sports. So far as I know, *C. persicum* has not been crossed with any other species of *Cyclamen*.

LATE CHRYSANTHEMUMS.—The two best that I have seen this season are *W. H. Lincoln* and *Princess Victoria*, the former a Japanese reflexed, very floriferous, the color a brilliant deep yellow, and the flowers lasting a month or more. It forms a very shapely bush when grown on what we call the natural method, and is in every sense a most decorative conservatory plant during December and January. *Princess Victoria* is also Japanese reflexed, the flowers large and full and pure white. It is at its best in January, and unless visited by heavy fog it lasts well. It was shown as a new variety in 1892, when it obtained an award of merit. I recently noted that *Madame Therese Rey*, a white Japanese, is at its best in January. Late-flowering varieties deserve more attention at the hands of breeders than they have yet received. We have numerous varieties which flower soon after midsummer and very useful they are, but good sorts to flower in January and February under ordinary treatment are still a desideratum with flower growers.

London.

W. Watson.

Cultural Department.

Close Root-pruning for Trees.

THE radical change in the method of transplanting trees from the nursery to the orchard, which has been within a few years past advocated by Mr. Stringfellow, of Texas, has set many tree planters to thinking and experimenting. The counsel to beginners used to be to get all the roots possible when the tree is set out. Mr. Stringfellow claims that this is unnecessary, and that, in fact, the tree will make a better growth if the roots are about all removed, and the top, of course, removed, at the time when it is set in the orchard. The tree then becomes practically a cutting, and it will begin at once to throw out the necessary supply of young and active roots, with a top to correspond. The practice of Mr. Stringfellow is to leave only an inch or two at the base of the old root, to furnish surface from which new ones will put forth.

In order to determine whether the method would be suitable for this climate, an experiment was begun on a small scale last spring, in which four trees each of standard and dwarf Pears, Early Richmond Cherry, German Prune, Peach and Quince, were selected for trial. The trees were two years old and as even in size as it was possible to get them. Two trees of each of these varieties were pruned so that not more than an inch or two of the roots remained, and the tops were entirely removed, leaving only a stick. A hole made with a two-inch stick was all that was needed in setting them out.

The other two trees were planted in the ordinary way, leaving the entire root-system. Before planting, the trees were all photographed, and after they had completed the season's growth they were taken up and again photographed.

The result of this experiment showed that the Peach was capable of producing a magnificent root-system and a top to correspond, even after being deprived of all its roots and branches to begin with. The dwarf Pear also made a fine growth, producing a finer root-development than the trees which were not pruned. The standard Pear was not quite as good, and the German Prune and Cherry were next in order. The Cherry made very little growth, barely enough to maintain life. The Quinces both died.

While this experiment shows results favorable to close root-pruning, it must be borne in mind that the season was exceptionally favorable for this work, as there were timely rains throughout the growing season. A dry season might produce entirely different results; for that reason we shall continue the experiment for a series of years and on a larger scale; so far it simply shows what these trees will do when treated in this way under favorable conditions.

La Fayette, Ind.

J. Troop.

The Hellebores.

IT is the intention of these notes to mention more especially the true garden Hellebores or varieties of *Helleborus niger*, commonly known as the Christmas Rose, but as there are several plants grouped together under the common name of Hellebore, and as some of these have been the means of bringing these beautiful winter flowers into bad repute, it may not be time wasted to consider the synonymy of these popular names.

In the first place, the *Helleborus niger* has no part in the composition of the insect powder sold under the name of Hellebore powder. This is made of the *Veratrum album*, or White Hellebore, as a basis, its properties of destroying caterpillars being well known. The North American species, *V. viride*, is also used, but is said to be less effective in results. The Winter Hellebore is the pretty little *Eranthis hyemalis*, or Winter Aconite, and there are two Orchids from which the French Helleborine is obtained, namely, *Serapias lingua*, a native of south Europe, also another Helleborine obtained from the genus *Epipactis*. Thus we see that under one generic term, Hellebore, we have plants that represent three distinct families, and this is a good illustration of the futility of popular names for plant identification.

Helleborus niger is so called from its black root-stock; it is the Christmas Rose of gardens because it flowers at that season if given treatment so that its flowers may expand at mid-winter without the blighting influence of severe frosts such as we experience in New England. In the latitude of New York I have grown these plants and had them flower admirably out-of-doors, though only in certain seasons. It is far better, however, to grow them wholly in frames, where they can be shaded in summer from strong sun, for if left undisturbed in such a situation, and protected in winter from cold, there is no difficulty in having flowers of spotless purity at Christmas, when they are most acceptable. It is possible that in the near future we shall see them grown in great quantity for the Boston market, as some of our commercial growers are preparing to have them in quantity, for only in this way can an impression be made. There is every reason to believe that the venture will be a success by having enough plants to lift half each year to produce a crop of bloom and let them rest the year following while taking in the other half.

Of *Helleborus niger* there are at least half a dozen well-marked forms cultivated in gardens. There is the narrow-leaved form, *Angustifolius* of English gardens, and another similarly named of Scotch origin, the latter having its white flowers tinged with rose. *Altifolius*, also called *Maximus*, has flowers five inches across, and often three on a stem. There is, too, an intermediate form known as *Caucasicus*, the still better-known *Madame Fourcade*, with snow-white petals, and lastly, *Major*, which rivals in size the giant *Altifolius*. Thus it will be seen that a collection of the form of *H. niger* alone make a most interesting group in themselves, and are really decorative subjects for the winter season when a little care is taken to supply their needs. It may be said of the whole genus that they dislike disturbance at the root more than most plants do. After division or removal it is often a year or two before they fully recover, hence the need of either planting in pots for plunging or frame treatment all the year, as noted.

Besides the true Christmas Rose, there is another section of the genus that has been developed from the different species

that are scattered all over Europe and extend into Asia Minor. There are about ten species from about as many different countries, and under garden culture a race of plants has been produced which are much superior to the species themselves. Of these the best are F. C. Heineman, Frau Irene Heineman, Apotheker Bogren, Doctor Schleicher Albin Otto, W. Schmidt, Commerz, Benary and Hofgartner Hartwig. These are all of German origin, and with their species flower about Easter-time in the open ground; it is possible to grow them out-of-doors the year round if a little protection is given to the evergreen foliage in fall in the way of dry leaves or hay to help collect the snow round the plants. They are, indeed, very suitable for planting as an undergrowth for trees or shrubs that would furnish shade in summer, while they do not rob the soil of so much moisture as to impoverish the Hellebores. A good soil rich in vegetable humus is well adapted to their growth; a top-dressing of leaf-mold will best aid in keeping the plants in vigor, and it should be left as a mulch rather than spaded in and mixed with the soil, as there is danger of disturbing the roots by this operation.

Two species of Hellebore are found wild in Great Britain, though possibly not indigenous. *Helleborus foetidus* is of a semi-shrubby habit and a plant of great decorative value on account of its fine foliage effects in winter; the other species, *H. viridis*, is similar, and both have green flowers that are the least desirable feature of the plant, their foliage being more ornamental.

Hellebores bear seed freely, and this may be sown preferably as soon as ripe, or some time will elapse before the young plants appear. But as both the winter and spring flowering sections cross readily, it is possible by forcing one and retarding the other to hybridize the two sections and get very desirable plants. Strong plants are readily separated, and this is the best way to increase any desired variety.

South Lancaster, Mass.

E. O. Orpet.

Pandanus.

FEW plants are more useful or better known than *Pandanus Veitchii* and *P. utilis*, though it is hardly clear why these are so generally grown, and other distinct and beautiful species of the same genus are neglected. True, these two species will endure more hardship, but some others are equally good decorative plants. *P. ornatus* is a handsome species with rather broad, bright, shining green leaves, furnished with white spines. The marginal spines are strong, but those along the midrib are somewhat minute. The leaves are more erect than those of *P. utilis*, and their growth is not quite so rapid. *P. glaucus* grows compactly and has shining bluish-green leaves, furnished with white spines. *P. laevis* is a tall-growing species with the screws occurring closely; the spines are sharp, brownish green, the lower ones on the midrib curved, and often alternately recurved. *P. Pancheri* looks much like a green *P. Veitchii*, only the leaves are narrower. *P. javanicus variegatus* is one of the most beautiful of all the varieties; the leaves are long, narrow and somewhat drooping; the ground-color is bright green, with bands of white traversing the entire leaf.

These are a few of the more distinct forms, and all are of comparatively easy cultivation. Screw Pines (as they are commonly called) seldom flower under greenhouse treatment or until they have attained considerable size, so that it is hard to procure seed from this source, though seed of the more commonly grown sorts can usually be procured from seed stores. But this method of increase is seldom resorted to, as offsets are easily procured from most of them. The offsets should not be taken at too small a stage; they root quite readily, but the crowns must be kept well up to avert the danger of damping. They may be inserted in an ordinary propagating-bed, or singly in small pots in a mixture of sphagnum and sand, and potted on when well rooted. In shifting large plants it is a good plan to use some antidote to acid in the compost, such as charcoal, as there is nothing so injurious to these plants as sourness in the soil. Large shifts or frequent repotting is unnecessary, as they need comparatively little root-room in proportion to the size of the plant, but when potting they should be set well down in the pots, as they incline to push themselves up out of the soil. Roots are quite freely sent out from the stem at the base of the old leaves, and in their downward course they sometimes need to be guided a little so that they will not run outside of the pot. Some soft tying material should be used, so that there will be no danger of cutting the roots. Some growers do not syringe during the winter months, as the water is apt to accumulate at the axils of the leaves and cause decay, but if a minimum

night temperature of sixty degrees can be maintained and fresh air often admitted, there will be little danger from this source, and an occasional syringing helps to keep the plants clean. The most injurious insect enemy is scale, which quickly disfigures the leaves if allowed to get a footing. But these plants are not particularly subject to pests. An occasional sponging with water and whale-oil soap is a preventive. To bring out the true characters of the variegated forms the plants should be kept moderately shaded. If exposed to strong light the colors lose their brightness to a considerable extent, the white assuming a greenish hue and the green becoming lighter.

A plentiful supply of water is necessary during the summer months, but in winter less is required, unless the plants are exposed to the drying influences of fire-heat and the lack of atmospheric moisture. These conditions should be avoided as much as possible, as they do better in a moist atmosphere.

Tarrytown, N. Y.

William Scott.

Onions.—Every one who has adopted the plan of sowing Onion-seed in boxes and then transplanting the young seedlings, is convinced that in one respect this is preferable to the old way of sowing the seed in drills where the plants are to remain. Not one-sixth as much seed is needed as with the old method, and the little labor involved in pricking out the young plants is more than offset by the great saving of time in weeding and thinning under the old system. Hardly any manual work in the garden is more troublesome than weeding among small Onions, but when the ground can be cultivated several times before they are set out many of the weeds are killed, and, besides that, the young plants are of a sufficient size to be seen, and there is less trouble in working among them. By the new plan, as it is called, although it has been practiced for a good while by individuals, an even crop is always assured and the plants are less liable to attacks from cut-worms and wire-worms. We sow the seed about the middle of February in ordinary seed-boxes, with a compost of loam with dried and pulverized manure, and we set the boxes on the shelf of a cool house. About the middle of March these boxes are transferred to the frame and the plants are hardened off gradually. The young plants are set out early in April in rows two feet apart and six or eight inches between the plants, according to the variety. Where space is valuable the rows may be left eighteen inches apart, but it is much more easy to cultivate between wider rows. Every variety I have tried is improved by transplanting, and all mature earlier than when they are treated in the old way. Our best keeping varieties as well as our best-flavored ones last year were Prize-taker, Ailsa, Craig and Cranston's Excelsior. The two last-named are superior English varieties. Silver King and Giant Rocca will grow to enormous size under this treatment, but they are not good keepers. For a general grade we use Yellow Danvers and Red Wethersfield. As a rule, white varieties do not keep well, the best we have tried being the Queen.

Taunton, Mass.

W. N. Craig.

Correspondence.

The Choke Cherry in Cultivation.

To the Editor of GARDEN AND FOREST:

Sir,—Recent notes in GARDEN AND FOREST, as well as other sources of information, seem to indicate that the Choke Cherry is unknown to cultivation. Such is not the fact, although its use is apparently limited and local. One of the earliest recollections of my boyhood has to do with two or three Choke Cherry trees beyond the garden in the edge of the old orchard, and I can almost feel their pucker yet, and I recall the feeling of danger when some older companion would utter the grave warning never to drink milk after eating choke cherries. These could hardly be called cultivated choke cherries, however, and the trees were simply spared where they had chanced to spring up.

In distinct contrast with this puckering little fruit I call to mind another kind, always spoken of as the "tame" choke cherry. The merits of this fruit may have seemed greater than the reality, since none of it was to be found on our own farm. Still, any boy would call this fruit good, and when prepared for the table boys still call it good, no matter what may be their age. The botanical characters of the tree appear to be the same as those of the wild Choke Cherry, *Prunus Virginiana*, though the tree reaches a larger size than that commonly reached by the shrubs along the fence rows. In this cultivated form the trunk often reaches a diameter of from

four to six inches, and the tree attains a height of fifteen to twenty feet.

The fruit is much larger than in any wild forms which I have seen, perhaps ranging from three-eighths to half an inch in diameter. It also has much less astringency, and whatever remains of this entirely disappears with cooking. The fruit is much used both for pies and sauce, and is also canned for winter use. Any criticism as to its quality in these forms would be that it lacks in pronounced flavor rather than that it possesses any strong or unpleasant ones. It does not make a rich sauce, but one which is, on the whole, very cooling and agreeable.

It is not necessary to cook the fruit in order to dispel its astringency. Those most familiar with its use have learned that when the fruit is fully ripe, if it is put into a cloth sack and rolled back and forth or shaken in a closed vessel, this quality disappears. Treated in this way and served with sugar and cream, like peaches or other fresh fruit, it is a dish by no means to be passed by. I do not remember that the fruit was ever used for jelly, but, of course, it might be and perhaps is.

There are certain qualities possessed by this fruit which seem to make it worthy of being better known than it now is. In the first place, it ripens at a time when other cherries are gone. Furthermore, the tree is uniformly productive, seldom, if ever, failing to yield a crop. Although small, the fruit is borne in clusters, so that it is quickly and easily picked. It also has the quality of remaining a long time on the tree after ripening, which is a desirable feature for home use. The tree is apparently well able to care for itself, for all of those which I have observed have been growing absolutely without care. It seems further that it must have few serious enemies, otherwise it would not prove so uniformly productive. As to its longevity I cannot testify. Among the trees of my earliest remembrance several are gone, while others, when I last saw them, were still yielding their annual crop of fruit.

The chief objection against this little recognized claimant for admission to our gardens is its small size and the consequent number of pits. If the suggestion of one of your correspondents for a pitting machine were to take tangible shape it would add greatly to the importance of this fruit. Indeed, there seems to be no reason why such a machine should not be as readily devised for cherries of this size as for larger ones. It is possible that the same machine might answer for both, for in size these fruits are about intermediate between the wild choke cherry and the Early Richmond. As commonly served the pits are left in, and in that case it becomes largely a question of leisure, for while they are easily removed it takes time to do it.

So far as I have learned the history of this fruit from inquiries made in northern Pennsylvania where I have known it, the original trees were brought to that region from Connecticut by one of the older settlers. The trees sprout from the roots to some extent, and these sprouts have served as a means of distribution in this farming community, so that it is not at all an uncommon fruit in that immediate vicinity. As to its remoter history I know nothing. Probably it is merely an improved form originally selected from some hedgerow. The variation in size of fruit which these wild groups present certainly lends color to such a supposition.

University of Nebraska.

Fred W. Card.

Notes on the Hybrid of Maize and Teosinthe.

To the Editor of GARDEN AND FOREST:

Sir,—In the American Museum of Natural History, New York City, there is an ear of corn displayed in the room on the ground-floor at the left-hand side of the main entrance which was collected by Carl Lumholz, the explorer, among the timid Tarahumara Indians of Mexico. It is identical in all respects with the form which I described in GARDEN AND FOREST (vol. ix., page 522), as produced by crossing, for three seasons successively, Teosinthe and Maize. It is interesting to note the occurrence of this form among a wild tribe which comes little in contact with white men.

Dr. Nicolas Leon, of Mexico, informs me that this hybrid is encountered among the Mixes and the Zapotecs inhabiting the state of Oaxaca, and that there it is called Maiz de los gentiles.

Another interesting fact concerning Maize and Teosinthe is one made known by Dr. William Trelease, of the Missouri Botanical Garden. It is well known that Corn smut, *Ustilago Zea-Mays*, fastidiously confines itself to the Maize-plant, being found on no other plant. Dr. Trelease discovered that it also grows parasitically on Teosinthe, a fact which also points to the close affinity of Maize and Teosinthe, if they are not identical.

University of Pennsylvania.

J. W. Harshberger.

Meetings of Societies.

The Nebraska State Horticultural Society.

THE twenty-eighth annual meeting of this society, recently held at Lincoln, was devoted largely to forestry and landscape-gardening. In the first paper presented, Mr. Peter Youngers, of Geneva, spoke of the trees which had proved especially adapted to the conditions and climate of Nebraska. The American Elm leads all other trees as a shade-tree for that state, although, of course, it is not as good as some others for its timber. The Honey Locust and the Green Ash have been almost universally satisfactory, while the Scotch and Austrian Pines in their younger stages are thrifty growers. The Black Walnut flourishes in moist soil, and the wild Black Cherry makes a rapid growth for a hardwood tree, although it has suffered from sun-scald during recent dry years. There has been an astonishing mortality among Mulberry-trees during these same dry years. Mr. Harrison, of Weeping Water, also spoke in high terms of the Honey Locust, especially for its power of resisting drought.

Dr. C. E. Bessey, in speaking of the distribution of the forest-trees in the state, defined native trees as all those which were found here by white settlers, although it is possible that the Indians may have introduced some of these. *Pinus ponderosa* has come down the streams from the west, and remnants of these trees are found much farther eastward than they now grow. Some discussion about the Diamond Willow followed, and persons most familiar with the woodcraft of the state were evidently not ready to relinquish their belief in this tree as a distinct type or species. Many others thought that its peculiar formation is due to individual peculiarities or the work of insects. Dr. Bessey gave an interesting account of the range of most of the well-known trees of the state, and, among other things, he stated that the Hickories have had a very hard time in Nebraska, and for the most part only creeping up the streams a little way.

Professor F. W. Taylor made a trip through Russia last summer, and in speaking of horticulture in that country he stated that little fruit is grown in the latitude of St. Petersburg—a few strawberries and fewer bush fruits, and no apples whatever. The latter fruit is hardly seen as far north as Moscow, although the traveler going south begins to come into the region of cherries at this point. The Cherry-trees are all short-lived, grown on their own roots, and new sprouts are allowed to come up about the base to take the place of the old trunk as soon as that fails. It is not probable that these trees would last ten years in the climate of Nebraska, being all dwarfs of the English Morello type. Russian varieties of Apples are very local, and they are poor, as a rule. There are no great nurseries which serve as centres of distribution, and therefore these varieties are confined largely to the immediate sections where they originated. This is the reason for the confused and hopeless state of the nomenclature of the Russian fruit-trees which have been sent to this country. No doubt, some of these Russian fruits have enabled the farmers of the northwest to grow some kind of an apple in a more trying climate than would have been possible with our ordinary varieties, but the more we know of the Russian Apples the less we find in them of value.

Dr. Ward talked in an entertaining way of the impressions which he had received of the forest-gardens of the Harz Mountains. This region is some fifty miles long and half as broad, and one who looks from the summits of the ranges is impressed by the smoothness of the landscape and the checkered appearance of the woods made by the alleys running between forest blocks. These alleys run perfectly straight without regard to the contours of the land, and are kept clean and free from all vegetable growth. The squares are of different sizes, but all the trees in the same square are of the same size. For a small fee people have permission to gather limbs or forest material from the ground, but no axe is allowed to be taken into the woods. A cart for carrying away the collected material may be brought and left at the roadside, but cannot be taken into the forest. Trees to be cut are marked by the forester and the measure is recorded, so that when the wood is piled up at the roadside the amount must correspond with the measurement. At various points selected with reference to their soil and aspect there are clearings for the homes of the foresters surrounded with beds of forest seedlings. The woods are very carefully protected against any intrusion, no one being allowed to light a fire anywhere, with no smoking even in the grass by the roadside, and no hunting except by Government permits issued to the foresters and to individuals at a certain fee. Visitors, however, can go where they will,

and even in places where there are fences to keep the game there are gates to admit passing through. Good roads are necessary in good forestry, and therefore there are public highways through the forests, macadamized, well-drained, carefully guttered, and having easy grades. These are kept in perfect condition, swept and raked after rains, so that nothing remains on the surface. Besides these there are ordinary dirt roads, carefully laid, beautiful footpaths two or three feet wide, and railroads provided for travel through the mountains, even where their construction has not yet been needed.

Professor Card spoke of landscape-gardening as a fine art which ranked with painting, sculpture and architecture, and after a brief historical sketch he said that the work of the landscape-gardener was to produce nature-like effects—that is, to compose a picture which interprets nature rather than one which imitated nature slavishly. A landscape-painter can vary the forms of his trees to meet the demands of his picture, can introduce a mountain background or a wandering stream, but a landscape-gardener is held in by stricter limitations. He cannot even select a single point of view, as the painter can, but must present his picture from every direction. Besides this, the painter completes his picture as it is to remain forever, while the gardener must work with constantly growing materials in such a way that they shall always be presentable, and, if possible, so that they should always improve. Professor Card's lecture was illustrated by lantern slides, which showed the qualities of some of our best trees; some examples of ancient topiary work, and the accomplishments of some of our modern expensive styles of carpet-bedding, contrasted the freer forms of natural planting. Pictures were also exhibited to show how highways, school-grounds, cemeteries and home-grounds could be made more attractive.

Mr. J. A. Hogg, in giving his experience with orchards in the south-central part of the state, said that the trees in that section were headed low (1) to prevent hail from striking the body of the tree, since borers are likely to enter wherever the bark is bruised; (2) to prevent sun-scald; (3) to protect the roots from the sun's heat; (4) to protect the tree against wind so that the pollen will not be blown away nor the fruit blown off; (5) to make fruit-gathering easy. The best fruit in that region is found on the lower limbs of the trees. In gathering cherries it is oftener necessary to lift up the limbs than to use a ladder to reach them. Russian Mulberries and Honey Locusts, being free from insects and furnishing abundant nectar for bees, make desirable wind-breaks. On the north side of a Mulberry hedge, Currants, Gooseberries and June-berries will do well. A row of three-inch tile under every row of trees or bushes for the purpose of subirrigation has proved useful wherever tried.

Mr. L. M. Russell, in giving his experience with Peaches, said that he had sold 12,000 bushels last year, and that 3,000 more rotted on the trees owing to the ravages of a black fungus which was most severe on common varieties. He thinned away about half of this fruit and he ought to have picked off half of what remained. The trees are now planted fourteen feet by eighteen, although they were originally planted much closer. The Wright has proved their most profitable variety, although it is late.

Mr. H. F. McIntosh, of Omaha, in speaking of the horticultural press, said there were some forty publications in the United States nominally devoted to horticulture or some of its branches, but most of these belonged to the class known as "house organs"—that is, they are papers connected with and managed by commercial establishments. Many of them are good journals, and they can afford to be, since they offer an opportunity for the publishers to send out advertising matter at one-tenth of the postage which it costs to send out catalogues and circulars. About one-third of these publications have a circulation so small that it is not rated, and our very best ones are not liberally supported. Horticulturists especially do not support these publications as they should.

Professor Swezey, in speaking of the conservation of rainfall, says that the evaporation from the water surface at Lincoln last year was forty-four inches. The year before it was forty-eight inches. The reason for this great amount of evaporation is the dryness of the air, the windiness of the climate and the high temperature. Of course, where moisture is so much needed in the soil, every effort should be made to preserve it, and he repeated the reasons for surface tillage as a check to the waste of water.

Dr. Bessey advocated attempts at reforesting the sand-hills of Nebraska, which, in fact, were not all sand. The valleys between the ridges formed pockets with little ponds of water in wet times. The sand in the hills is not always drifting sand and it is not always poor. The hills are covered with grass, and this is heavy in the valleys. There are wild Plum-trees in

the moist spots, and the Lead-plant is often found on the slopes. The grass is never dense, but is tenacious enough to hold the sand from blowing, and furnishes a large amount of pasturage. There are remnants of former Pines scattered over the regions which are not all worthless land, and should be made more useful. The valleys are very rich, but when the sod is broken on the hills the sand begins to drift. Dr. Bessey thinks it ought not to be more expensive to start a productive forest in these sand-hills than it was to cut away the forests for agriculture in the older states. Pine timber grows on thinner soil than this in Michigan, and there seems to be no reason why it should not grow here after it is properly started. Altogether he considers the problem well worthy of state or government investigation.

Recent Publications.

A Popular Handbook of the Ornithology of Eastern North America, by Thomas Nuttall. Second revised and annotated edition. By Montague Chamberlain. With additions and one hundred and ten illustrations in colors. Little, Brown & Co. 1896. 2 vols., 8vo.

Nuttall's fame, though resting mainly on his botanical writings, owes much to the *Manual of Ornithology*, the first volume of which appeared in 1832 (with an enlarged edition in 1840) and the second in 1834. The cause of the popularity that this work immediately obtained is not far to seek. It was the first handbook of the subject, and presented it in an extremely attractive manner, combining a sufficiently scientific account of our ornithology, with a series of charming sketches of bird-life that have rarely been excelled. The work had been long out of print, when in 1891 the publishers decided to issue a new edition, and Mr. Chamberlain was entrusted with its preparation. The work before us is a revised issue of this edition, with a few changes and additions, including the introduction of the colored plates.

The classification and nomenclature of Nuttall's work have become antiquated, and many new species have been added to the list of our birds since he wrote. In the new edition it was decided to intercalate descriptions of these additional species and to give such information about the others as had been acquired since Nuttall's day. At the same time it was deemed advisable to exclude a few species occurring only west of the Mississippi, thus making a complete handbook of the ornithology of the eastern faunal province.

These variations from the original work are clearly indicated by typographical means, and come within the scope of editorial function, but one would have supposed that Nuttall's text in other respects would have been reverently treated. A comparison, however, of this edition with the original shows that many liberties have been taken. Whole paragraphs have been omitted in many of the biographies, with nothing to indicate such omissions. In fairness it must be added that these excisions have been judiciously made, and nothing of real importance has been lost, but when one finds that such things are done he cannot help feeling that he is being treated to a *réchauffé* from which, while he may praise the cook, he cannot trust himself to judge the flavor of the original dish. Against such a mode of serving a classic we must protest.

But, apart from these considerations, the work is an excellent guide to the study of our birds. Mr. Chamberlain's notes, though not copious, are sufficient to put the student in possession of what he should know of the recent studies in the subject, and his additional biographies are faultless. The handsome typographical dress makes the volumes a delight to the eye, and the colored plates, made up of figures copied mostly from Audubon and Wilson (though this is nowhere stated), add to the attraction of this revised issue. It merits, and will doubtless find, a wide circulation.

Notes.

We have often commended *Koeleruteria paniculata*, an ornamental tree of the second size, for its graceful foliage, especially in the earliest stages of its growth, and for its abun-

dant yellow flowers in midsummer. *Meehans' Monthly* adds to this commendation that in the fall of the year its rich crimson foliage vies with that of many of our American trees which have been celebrated in this respect. We should like to hear from correspondents, especially from those living south of this latitude, whether the leaves of these trees with which they are familiar take on this rich autumn color. We have not observed it in trees about here.

A cold wave has once more left the northern part of Florida covered with ice. So far as can be learned at this time the disaster to Orange groves was not nearly as sweeping as the great freeze two years before. Indeed, there were comparatively few trees in bearing, although in the old groves which were cut to the ground, root-sprouts have already reached a height of ten to fifteen feet. Prudent growers early in the winter wrapped the stems of these young trees with Palmetto leaves, straw and burlaps, which must have proved a great protection; and those who had not already taken this precaution had ample time to protect their groves after the weather bureau had warned them of an approaching cold wave. Fortunately, the low temperature was only of short duration. The extreme of cold was reached at six o'clock of last Thursday morning, and by nine o'clock the weather was rapidly moderating all over the state. No doubt, exposed buds and foliage were frosted, but let us hope that next year's crop will not be sensibly diminished. The blow was most severe upon the growers of early vegetables for northern markets. Throughout the northern part of the state truck-farms will need to be generally replanted.

Professor Georgeson, of the Kansas Agricultural College, in offering to send samples of the Soy bean to farmers of that state, gives in *The Industrialist* some account of the experience with this crop, of which several acres have been grown on the college farm for the past six years. Even in the years of severest drought the crop has not failed completely, and last year a yield of sixteen bushels an acre was harvested on the 31st of August, from ground seeded on the 19th of May. This crop is especially valuable since it can be grown on stubble-ground from which wheat and oats have been harvested and a fair yield secured. In feeding value the Soy bean takes precedence of linseed-meal, and is more valuable than any other concentrated food that can be found in the markets except cotton-seed meal, and this is sometimes poisonous when fed to pigs. The Soy bean contains two and a half times as much protein and five times as much fat as wheat bran, and it contains a greater percentage of protein than linseed-meal, and twice as much fat. Soy Beans are planted in rows thirty-two inches apart, and they are cultivated a few times to keep down the weeds and retain the moisture in the soil. Altogether this bean is one of the most promising of the additions to farm crops for the middle west, and it is likely to be more and more valued as its virtues are understood.

Last year three species of *Xylina*, commonly known as green fruit worms, large, light green caterpillars, did a great deal of damage to the apple crop by eating holes into the sides of young fruit in May and early June. These caterpillars are from an inch to an inch and a half long, and they have not appeared in dangerous numbers in the region infested this year since 1877. They begin to eat one side of the fruit, and continue until something like half of it is eaten, and then go to another one, thus injuring several fruits. They are not found on the trees after the middle of June. Fortunately, these caterpillars are inviting to the birds, and they suffer from parasitic insects, so that it is not certain that they will appear in dangerous numbers another year. Their attack would have been a serious matter last year but for the unusually heavy crop of apples throughout this state. After they begin to eat the apples there is little use in spraying them, but if the trees should be sprayed at least once, as is always advisable, with Paris green and Bordeaux mixture before the blossoms open, some of the worms might be killed. After the fruit sets the only successful and practical way of fighting them is to jar them off into sheets, as is done with the curculio. The soil should then be thoroughly cultivated during the summer, for this will kill many of the insects which are undergoing their transformation. Bulletin No. 123 of the Cornell Experiment Station, by Professor Slingerland, is devoted to this pest.

Newtown pippins, at forty cents to one dollar a dozen, are seen in some of the fruit-stores. Winter Seckel pears may be had for sixty to seventy-five cents a dozen, Winter Nelis at seventy-five cents to one dollar, and Easter Beurres for \$1.25. Large and bright-colored hot-house strawberries find buyers at

\$2.00 a cup, and well-grown Lady Thompson berries, from Florida, neatly laid in oblong splint baskets holding more than a quart of the selected fruit, cost \$1.00. Most of the Florida strawberries have been immature, lacking in color, and without much demand. Some forty boxes of mangoes were recently received from Jamaica by a wholesale merchant. Retail sales are almost entirely confined to former residents in the West Indies, though the distinctive fragrance of this stringy fruit tempts occasional buyers to try it as a novelty. New limes are coming from the Bahamas. A novel display in one of the fruit-stores was a bunch of grape-fruit, six of the heavy fruits closely clustered together on one stem. Florida Russet oranges now sell at wholesale for \$4.00 a box, and "brights" for \$4.50, though higher prices are occasionally asked by some foresighted dealers as the end of the season is approaching. Florida grape-fruit, in the desirable sizes of fifty-four and sixty-two fruits to a box, costs as much as \$13.00, or nearly twenty-five cents each, to the retail dealer. The same sizes of Jamaica grape-fruit are quoted at \$8.00 to \$9.50 a box. Very large and extremely small sizes bring much less, especially the latter, which are prematurely gathered.

The snowy, sunless days of last week were accountable for a large stock of cut flowers of second and third quality, which were offered by the street vendors on Saturday, when milder weather set in. Roman hyacinths and lily-of-the-valley, looking chilled and drooping, sold at ten cents for a bunch of less than a dozen stalks, three or four Meteor roses also brought ten cents, and small bunches of violets cost twenty-five cents. But these low-grade blooms are at best an unsatisfactory suggestion of the fresh and delightful flowers shown in large variety in the stores. White snapdragon, great spikes of mignonette and smaller ones of ordinary varieties, pansies, candytuft, jessamine and strikingly beautiful blooms of a large strain of Marguerites were displayed in one of the Broadway windows on Saturday, together with cut branches of the delicately foliaged and flowered *Acacia dealbata*. Single hyacinths of graded shades of lilac and purple, pansies, forget-me-not and the yellow variegated *Bouton d'Or* carnations, white and purple lilacs, and the orange and scarlet fruits of Bitter-sweet were all represented. The double flowers of Marie Louise violets sold for \$1.00 a bunch, and the large single California violet, of rich color and fragrance, in bunches of twice as many flowers, was in demand at \$1.50. Bridesmaid, Bride, Meteor, Mrs. Pierpont Morgan and Madame Cusin roses sold for \$2.00 to \$3.00 a dozen, and perfect buds of *Souvenir du President Carnot* for \$4.00 to \$6.00, with specially well-grown ones at \$8.00. Plants of *Azalea*, densely flowered, are becoming conspicuous features in the show windows.

There will doubtless be a scarcity of green vegetables during the next few weeks, owing to the frozen crops in Florida, but California, Bermuda and Cuba have already been drawn upon for string-beans, and other new vegetables will soon come from the southern Atlantic states. On last Monday southern supplies were greatly shortened and prices had advanced considerably. Bunches of new kohlrabi and beets, from Florida, cost ten cents each, string-beans were twenty cents a quart, and tomatoes twenty cents a pound. Peas have doubled in value within a week, and now command \$3.00 a peck. The last consignments of southern lettuce realized ten cents a head, but the hot-house supply of this vegetable, from Boston, is abundant, and prices have been as low as fifty cents for a dozen heads within the past few days. New carrots, from Bermuda, cost ten cents a bunch; parsley, peppers and Romaine lettuce come from the same islands, as do onions and potatoes, the latter worth forty cents a half-peck. Cauliflower comes from California by the car-load, and retails at twenty-five to thirty cents a head. Okra, from Cuba, costs ten cents a dozen. Small French radishes, grown under glass near by, bring five cents a bunch; hot-house tomatoes, forty cents a pound, and forced rhubarb, fifteen cents a bunch of a half-dozen stalks. Boston cucumbers readily bring thirty cents each in the entire absence of the southern product, and in some of the high-class fruit-stores they are each wrapped in oiled tissue-paper. Hot-house asparagus is also carefully wrapped, and that from the west sells for seventy-five cents a bunch, while the stouter and longer stalks from New Jersey cost \$1.00 for a bunch of about twenty shoots. French artichokes come from Europe regularly each week, as do Brussels sprouts, the latter costing twenty-five cents a pound, while the native sprouts cost twenty cents a quart. Mushrooms have been unusually plentiful and cheap, the best selling at sixty cents a pound.

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Abandoned Farms.

At a Farmers' Convention, held not long ago at Danbury, Connecticut, Mr. R. S. Hinman read a paper on "The Deserted Farms of New England," in the course of which he presented some novel phases of the problem which has caused so much discussion. It was admitted that there are deserted farms in Connecticut, but in the first place much of the land which has been abandoned ought never to have been cleared or tilled. As an illustration of this statement Mr. Hinman referred to one cold field facing the north-west and so full of fast rocks and bowlders that it would be hard to turn in it a straight and continuous furrow for a rod, while the scanty soil between the rocks is thin and sterile. A man now living remembers that in his youth he had planted this field with Corn on shares, and both he and the owner of the land were content with the crop and its cost; but the field has never been tilled since and will not be tilled again until men are content with wages of fifty cents a day while boarding themselves. In contrast with this, Mr. Hinman admitted that there are lands in the state which are easily tilled, readily accessible and apparently once productive, which have long been allowed to grow up to brush. In explanation of this he argues that the very fact of easy tillage and access wrought ruin to the land. The owners took crop after crop from it and returned nothing, because the process was temporarily profitable, until finally the available plant-food was exhausted. Then the cost of enriching the soil with fertilizers to the point of profitable productiveness was so great that the crops would not pay for the raising when they came in competition with those grown on cheap new western land.

But, besides rough and sterile lands and lands which have been rifled of their fertility by covetous owners, it is further admitted that thousands of acres of excellent pasture-lands have been abandoned to Hardhack and Blackberry vines, because Connecticut farmers preferred to lend their money to western competitors at eight or ten per cent. interest, rather than hire men to cut the brush and keep their farms in good heart for the future. When Connecticut passed a law allowing the registration of notes and bonds at a low rate of taxation, the farmers in one town of Litchfield County filed evidences of \$60,000 loaned to

western farmers. If that money had been used to improve their roads and enrich their lands these farmers might not have received ten per cent. on their savings, but they certainly would have had an investment safer than many western mortgages have since then proved. The plain statement of the case is that instead of using some of their savings to make their farms more productive, eastern farmers furnished working capital to their competitors, who naturally undersold them in their own markets and then never repaid the loans which gave them their start. Again, many an owner of a small farm found out years ago that he could make a better living in the city than at home, and although the land can be sold for a fair valuation the owner prefers to let it lie as an investment, in the hope that it will some day be worth still more, as will probably be the case if it is near a thrifty town or has some attractiveness of location.

It is to be remembered also that more people were needed to raise the same crop on the same land fifty years ago than are needed now, and that while horse-rakes, cultivators and mowing-machines take the place of men in the field, they do not need farm-houses to live in, and this accounts for the remains of a cellar and perhaps the remnant of a Lilac-bush, often seen along the roadside, to testify that here was once a home, where now there is none. These little farm-houses all over New England were once occupied by shoemakers, wheelwrights, tailors or people engaged in other home industries that are now carried on exclusively in cities and towns. This does not imply a diminishing population; it simply means that the concentration of all these mechanical industries in the villages makes fewer houses necessary on the farms. These old-time artisans could keep a cow and a horse, and by making boots or mending chairs at odd spells could live on land which would not of itself suffice to support a family. That they have left these farms simply means changed conditions, and not necessarily any deterioration in the number or general comfort of the population. And, finally, there is now and then a deserted farm-house which is fit for occupation and a deserted farm upon which a living can be made, but this is because the owner leaves it for his pleasure or his profit and does not choose to sell. Very few farms have been sold under mortgage, and where farms have been taken by foreclosure, this, according to Mr. Hinman's observation, has always been under conditions that would have produced the same result in whatever business the owner was engaged. That is, the number of farmers who fail because they conduct their business without adequate foresight, intelligence and industry is not proportionally greater than the number who fail in manufacturing, mining or commerce.

And what of the future? Very plainly the forests never should have been cut from land where nothing else will flourish. The natural suggestion, then, is that the best use to put these acres to now is to encourage a new forest growth upon them as the cheapest crop they will produce. Undoubtedly, if all the land in Connecticut that cannot be tilled with profit could be helped to reproduce its original forest cover this would not only help to furnish the needed wood-supply of the future, but it would add to the fertility of the remaining farm-lands by breaking the winds, mitigating hard-weather conditions and helping the supply of moisture. While it must be admitted that where hundreds of acres of soil have been made unproductive by careless cultivation, there must be a loss somewhere, Mr. Hinman does not consider the abandonment of many Connecticut farms a misfortune to the state. Gardens run to weeds, barns with rotting timbers and tumble-down fences, do not add to the beauty of a landscape, but whether the community will be improved by a new occupant who will restore the land to its former use depends on the character of the newcomer. No doubt, much of the land could be reclaimed—that is, if it were managed by the highest skill, it might pay men who are willing to live cheaply themselves and bring up their families cheaply. Mr. Hinman

cites examples where foreigners, every member of whose families—men, women and children—are productive workers, have taken possession of lands once abandoned. They do not need periodicals or books, because they do not read; they do not care for the conveniences that drove their predecessors into towns to get the advantages of schools and churches and libraries and social intercourse. But what do these peasant-farmers bring to the commonwealth? By cheap living and hard work they manage to undersell their neighbors. Perhaps this is an advantage to the community at large who buy farm products, but it makes harder lines for the average Connecticut farmer. Whether it pays to encourage the immigration of this class of agriculturists is certainly an open question. But Mr. Hinman finds that many abandoned farms are passing into the hands of well-to-do people who do not need to enter into the struggle as competitors of the hard-working farmer of to-day. Some of these men belong to the original stock who left the barren uplands of the state to accumulate fortunes elsewhere, and now they are attracted to the place of their birth by ties of sentiment. They relish their native air, and the old farms make summer homes for their families. And, besides this, there are many places in the state which have a quiet pastoral beauty, many others with strikingly picturesque features, and these are sought and bought for what they are, and not for the memories which cling to them. There is a tendency, too, among men of means, to get together landed estates of considerable size, not to speak of larger tracts for game preserves and experiments in forestry. Buyers of this sort will, no doubt, be welcomed, and, perhaps, they will feel that money invested in Connecticut real estate is better spent than in yacht-building or horse-racing. Even if they practice agriculture as an amusement simply, they are likely to benefit the laboring people in the neighborhood, and they are sure to make experiments with improved breeds of domestic animals and new methods of cultivation, from which observing neighbors will derive benefit. They may live on their newly bought acres only a portion of the year, but they can hardly fail to bring material aid and social improvement to the communities with which they come into contact.

No doubt, the reasons for abandoned farm lands presented by Mr. Hinman are every one of them genuine, and they account to a certain extent for the present condition of things. But, beyond and outside of them, every one must see that there is a continued and remorseless pressure upon agriculture which every eastern farmer feels. Whatever the reason may be, it is certain that the farming population throughout the middle and eastern states is stationary or actually decreasing in number, while the urban population is multiplying at a marvelous rate. The farmer, too, seems to be losing his relative rank as a social and civil factor in the commonwealth. How to prevent all this, and whether it ought to be prevented, are questions which do not come within our province. But it is in the line of our teachings to suggest that the sooner forests can be made to cover the bleak and barren hills of New England the better it will be for everybody. Few people realize how much the wood lot did to support the farmer in the old days. Years ago it was stated by a shrewd Maine man, Mr. Tom Ford, in the *Country Gentleman*, that although the New England farmer worked all summer to raise hay, oats, potatoes, corn, beef and pork he really received no fair wages for his work and laid up nothing from this source. It was the logs and bark from his wood lot, the staves and shingle stuff, the hoop-poles and cordwood that brought him all his ready money, and when his woods were cut away half his income was gone. No doubt, the best treatment of these abandoned hills, too steep and stony to till, is to help them to grow up again with Oak and Pine, for the protection and enrichment of the lands that are still worth plowing, and for furnishing a crop which the world will always need.

THE New York Commissioners of Fisheries, Game and Forests have made a preliminary report in which they urge with great reason that something be done to relieve the state from the anomalous condition in which its forestry work has been placed. New York owns a great forest preserve which it is little less than criminal to allow to go to waste. As a source of public revenue, and still more as an instructive example of what can be done under scientific management, this reservation should be put under the charge of skilled professional foresters to make it a model for our New World conditions, and be an object-lesson in forest economy for the whole country. Unfortunately, the state constitution actually forbids the use of the axe in any of "the lands of the state now owned or hereafter acquired, constituting the forest preserve." And this means that the men who made the constitution did not know that there was any such thing as rational or conservative forestry, or if they did know it, they felt that the people of this state were too ignorant to organize and develop any system of forest practice in an intelligent and scientific way, or that they were too corrupt to administer such a trust without official knavery. It is suggested in this report that inasmuch as it is proposed to purchase large additional areas of woodlands, a special appropriation might be made for acquiring some tract of virgin forest in the Adirondacks, to be set apart as an experiment station, where the practicability of carrying on scientific forestry work with profit might be demonstrated. We hardly see how this can be accomplished under the constitution, in which it is stated that this forest preserve shall be forever kept as wild forest land. Perhaps forest land purchased outside the limits of the so-called preserve might be exempted from the constitutional prohibition, and, if so, it is to be hoped that the legislature will take steps toward acquiring some woodland which can be made directly useful as a source of forest supplies, and still more valuable from an educational point of view. The Commissioners believe that with such an enterprise fully inaugurated, a forest academy, well endowed from private resources, would soon follow. If such a school could be located on the experimental grounds, where students could have an opportunity to see and practice systematic forestry, we should have the beginning of that trained corps of foresters which will be needed in the twentieth century, if we are to make the most of the forests of our state and of the forests of our national domain, and of those owned by private individuals and corporations throughout the country.

The Visalia Oaks.

ONE of the finest groves of *Quercus lobata*, near Visalia, is known as the Mooney Ranch Grove, on the motor line to Tulare City, and about five miles distant. It is said to cover nearly 150 acres, and the illustration on page 55 gives a very good view of it. While most of the trees are about a foot or eighteen inches in diameter, there are enough of the old giants of five and six feet in diameter to give character to the woods, for one is never out of sight of several such trees, and often finds a group of a dozen or more which seem to occupy nearly the whole field of vision.

The plant in the foreground, which seems to be a tall white flowering shrub, is really a Milkweed, as it appeared in November, when the photograph was taken. It is one of the taller species, often four or five feet high, and grows abundantly in the foot-hills and the adjacent plain, having worked down from the Sierras. It is also found along the watercourses spreading through the Oak forests. I saw it from the car-window in several places as we crossed the Visalia country, November 18th of last year, but secured no specimens. These *Asclepiads* and a tall, spreading, very brilliant Sunflower, under the influence of October showers, had put forth immense numbers of small, late blossoms among the dry seed-heads and along the main stalk.

I did not find time to measure any trees accurately in the Mooney Grove, but there is a small grove of about forty acres a mile from Visalia, which ought to be owned by the town, and here, within a radius of less than two hundred feet, I took the girths of five trees at six feet from the ground, and they ranged from eleven to fifteen feet, and the heights ranged from fifty-five to ninety-four feet. One of the trees, an old one, with considerable branch-room, had a broad spreading top (the top broken off). Another was tall and straight, with a trunk without a branch for twenty-five feet. The height of some of these Oaks is surprising. They seem to have grown in great thickets, in windless places, and the need of light and air forced them straight upward.

The Oaks in this little grove grow on a very heavy alluvial soil, so rich in alkaline salts that the common Alkali Grass of the plains, *Distichlis maritima*, is all that covers the surface. The soil, unlike that in the Mooney Grove, is unfit for farming, but the place is very attractive, covered as the surface is with this coarse Bermuda-like Grass, and so green and golden in this November season. The Oaks themselves are of many colors, though every tree on the forty acres is a *Quercus lobata*, for some are nearly leafless, others show yellow foliage, and still others are various shades of green. The bark also varies from smooth to very rough, and from dark brown to ashen gray. The lower branches are sometimes drooping, like those of so-called weeping-trees, but they sometimes extend nearly horizontally, though the normal type of the older trees is especially upright, as shown in the photograph of the Mooney Grove.

Niles, Calif.

Charles H. Shinn.

Paradise Valley.

THERE have recently appeared in GARDEN AND FOREST two or three articles upon the flora of Mount Ranier, especially that part of the mountain known as Paradise Valley. It occurs to me that an enumeration of the flowers found in this wonderful little valley would be of interest, and since I spent some time in studying the botany of Ranier last summer I am pleased to undertake such an enumeration.

Paradise Valley is situated on the south flank of Ranier, at an altitude of from 5,000 to 6,000 feet; it is in a Government reservation, the Pacific Forest Reserve. The Reserve, the crowning feature of which is the great mountain, is in the Cascades of western Washington, and covers an area of thirty-six by forty-two miles. In it is, perhaps, the greatest glacier system on the continent south of Alaska. Several large rivers head in the glaciers, and between two of these, the Nisqually and Cowlitz, up among perpetual icebergs, Paradise Valley is situated.

I judge that the valley is from four to six miles long and from a half mile to two miles wide. Its outline is very irregular and its surface rough and rugged. But the interest and attractiveness of the valley lie not so much in its formation as in its covering. An alpine meadow could hardly be more beautiful. The valley is covered with a perfect carpet of flowers, excepting here and there a dash of snow, a rocky crest, or a grove of Alpine Firs and Mountain Hemlocks.

The background for the floral display is composed of two Dog-tooth Violets, *Erythronium montanum* and *E. grandiflorum*; the former is pure white, the latter with a tinge of yellow and rose. Along streams and bordering snowbanks acres of ground are literally covered with these flowers. The two species alternate in the floral design, seemingly without reason, so that we have now a spread of white, and next a cloth of gold.

In the drier parts of the valley, two Heaths, *Brianthus empetrifloris* and *Cassiope Mertensiana*, form the greater part of the display. The first is a span, or a little more, in height, much branched, and has its foliage almost hidden with umbels of rose-colored campanulate flowers. The

second is taller and has pure white campanulate flowers, borne singly, and nearly hidden by the leaves.

A pretty pale blue Aster, *Erigeron salsuginosus*, grows nearly everywhere. *Potentilla gelida*, a Buttercup-like flower, and fine Arnicas furnish an abundance of yellow. In the groves there are many mountain Rhododendrons, handsome shrubs, several feet high, with pure white funnel-shaped flowers. *Spiraea rosea* is a common shrub on the cliffs. There are several Saxifrages, three or four species of *Mimulus*, a common and pretty one being the little yellow Monkey-flower, *M. alpinus*. *Orthocarpus pilosus*, the flowered Painted Cup, is plentiful. A handsome Knot-weed, *Polygonum bistorta*, bearing a spike of pure white flowers, grows almost everywhere in the valley. Wild Heliotrope, *Valeriana Sitchensis*, with corymbs of fragrant pinkish flowers, is common. There is a profusion of *Anemone occidentalis*, the mountain Anemone, its curious feathery seed-tops reminding one of the beard of a mountain goat. Several Lilies are found. Green Hellebore, *Veratrum viride*, *Dodecatheon crenatum*, *Gentiana calycosa*, *Pentstemon Menziesii*, are all plentiful. A bright yellow Aster, *Erigeron aureus*, is found in the higher parts of the valley. Accompanying it are generally a lovely blue Lupine, *Lupinus Lyalli*, and *Polemonium humile*, a light blue flower with a yellow eye. On the rocks, in this almost the highest part of the valley, *Spiraea cæspitosa*, a silky tufted plant with an abundance of small flowers, forms a thick velvety mass that excludes all other plants. Tolmie's Saxifrage, *Saxifraga Tolmiei*, found a little higher up, forms similar mats. In the volcanic débris a Daisy-like purple Aster, *A. pulchellus*, is common. At this altitude the elements have dwarfed the Firs and Hemlocks into prostrate shrubs, with trunks greater in diameter than in height, their long, gnarled branches sprawling on the rocks. The alpine Juniper, *Juniperus communis*, var. *Sibirica*, is common here. *Spraguea umbellata* is one of the odd plants to be found here; its radical, fleshy, spatulate leaves rise from a thickened root, and its rose-colored flowers are borne in a dense capitate umbel of nearly sessile spikes.

Grasses and Sedges are common wherever plants can grow in the valley. There are several Ferns, an abundant pretty one being *Phegopteris alpestris*. *Protococcus nivalis*, the Red Snow-plant, forms blotches of a gory hue here and there on the snow-fields. Wood and rock are covered always with Mosses and Lichens.

Now and then there is an alpine grove of *Tsuga Pattoniana*, one of the handsomest of all Hemlocks, and *Abies lasiocarpa*, the alpine Fir. These groves are very picturesque; the drooping, dark green branches of the Hemlock bending with festoons of Lichens intermingled with the pale green foliage of the stately Firs, with now and then an Alaska Cedar, *Chamæcyparis Nootkatensis*, make a beautiful picture for a lover of trees.

Oregon Agricultural College, Corvallis, Or.

U. P. Hedrick.

Foreign Correspondence.

London Letter.

DENDROBIUM BANCROFTIANUM.—This is a variety of the Australian *Dendrobium speciosum*, from which it differs in having thinner, shorter pseudo-bulbs, smaller leaves and shorter, looser racemes of white flowers, with a few spots of purple on the labellum. Messrs. Sander & Co., who have lately introduced it, and with whom it flowered a few weeks ago, say that it grows and flowers with much greater freedom than the type. They exhibited a plant of it last week bearing six flower-spikes, and it was awarded a botanical certificate. The type is a very old garden Orchid which grows well from year to year under ordinary treatment, but only rarely flowers. I lately saw some fine specimens of it which had been hung under a tree in the open air in July and August, and they had made exceptionally large pseudo-bulbs. When bearing its long fox-

brush-like spikes of fragrant flowers it is an attractive Orchid, and, indeed, it is worth a place in collections if only on account of its large pseudo-bulbs and fleshy leaves. *D. Bancroftianum* is also from Australia.

MORMODES LADIUM.—This is a new species, recently flowered in the collection of the Hon. Walter Rothschild, Tring, and named by Mr. Rolfe. It is very near *Mormodes igneum* of Lindley, figured in Lemaire's *Jardin Fl.*, iv., 330, the scape being erect, a foot long, bearing about a dozen large flowers, the sepals and petals colored dark red, the lip paler and yellowish brown. A variety, also flowered at Tring and named *luteum*, was shown last week and obtained an award of merit. It differs from the type in having bright yellow flowers. The two were introduced together from Peru. All the *Mormodes* are handsome-flowered Orchids, and were it not for the fact of their behaving badly under cultivation they would rank with the best of garden Orchids. *M. luxatum*, *M. Ocanæ*, *M. parvum* and *M. Colossus* are introduced from time to time, and for the first year or so afterward are features of English collections, soon, however, to disappear. We grow them along with their cousins, the *Catasetums*.

ODONTOGLOSSUM CRISpum STEVENSI.—Baron Schroöder has, under this name, a plant which is generally considered to be the handsomest of the many select varieties of *Odontoglossum crispum*, and he exhibited it last week in finer condition than has ever been seen before. The spike was a yard long, gracefully arched, and it bore fourteen flowers, each five inches across, white, heavily blotched with reddish brown, the lip with a very large blotch in front of the crest. The size of the flowers and the richness of the markings are its most striking features. The plant has been in the famous Dell collection since 1886. The keen competition for the possession of these uncommon forms of *Odontoglossum* was exemplified at the auction rooms this week, when Messrs. Sander & Co. obtained for a supposed hybrid, *O. crispum* × *luteopurpureum*, the sum of 105 guineas. The flowers of this plant were three inches in diameter, yellow, with blotches of chestnut brown.

ONCIDIUM SPLENDIDUM is a most useful winter-flowering Orchid. It requires warm greenhouse treatment and plenty of sunlight to develop fully its broad pseudo-bulbs, thick, fleshy leaves and tall spikes of yellow and brown flowers. These last are in fine condition now. It is difficult to understand those botanists who insist on calling this plant a variety of *O. tigrinum*, also flowering with us now. There is some resemblance in the size and color of the flowers of the two, but in the form of the labellum, the size of the basal lobes, as well as in the character of the spike, there is a wide difference. Then, again, *O. tigrinum* is deliciously fragrant, while *O. splendidum* has no odor. In the characters of pseudo-bulb and leaf there is a marked difference between these two plants, *O. tigrinum* having thick, smooth pseudo-bulbs, with two, three or four comparatively thin, curved, shining green, acuminate leaves, while in *O. splendidum* the pseudo-bulbs are flattish, rugose, and each bears only one oblong, blunt leaf, which is very thick, erect, and becomes purplish with age. Another important difference is that while *O. tigrinum* is easy to grow and keep in health for an indefinite time *O. splendidum* soon wears out under artificial treatment. These differences have been spoken of as "no more than what might have been brought about by local environment," an argument which might be used with much greater reason against many species and even some genera.

BULBOPHYLLUM DAYANUM.—Although this plant has been in cultivation since 1865, when it was named by Reichenbach in compliment to that eminent amateur Orchid grower, the late Mr. John Day, it is rarely flowered. A plant of it was shown in flower last week from the collection of the Hon. Walter Rothschild, Tring, where *Bulbophyllums* of all kinds are grown exceptionally well. *B. Dayanum* belongs to the small, compact-growing set, the pseudo-bulbs being crowded on thin creeping rhizomes, roundish, smooth, about an inch in diameter and of a dark red-purple color.

The leaves are three to four inches long, elliptic, green above, reddish beneath. The flowers are clustered and borne singly on short petioles; they are each an inch in diameter, the sepals broadly ovate, green, with purple streaks and fringed with long hairs; the petals smaller, colored red and yellow; the lip trigonous, green, with ridges of blood-red on the disk. It is a native of Tenasserim. There is a figure of it in *The Botanical Magazine*, t. 6119. An example of it has been in the Kew collection many years.

ORCHID FARMING.—An interesting paper is published in the Bulletin of the Botanical Department, Jamaica, for November, 1896, by Mr. R. Thomson, formerly Superintendent of the Botanical Department, Jamaica, recommending the naturalization of *Odontoglossum crispum* in the Blue Mountains of Jamaica, with the view of supplying the now enormous demand for this Orchid which, through various causes, is being rapidly exterminated from its home in the Colombian Andes. He proposes that groups or colonies of this Orchid should be established at intervals of a mile or so in the forest where they would seed, and "in the course of ten years scores of thousands of plants would be naturalized and fit for export annually." Mr. Thomson points out that about twenty-five per cent of the plants of this *Odontoglossum* exported from Colombia perish in transit to Europe, owing to the long distance from the collecting grounds to the port, a difficulty which would not be experienced in Jamaica. *O. crispum* is certainly by far the most popular of all garden Orchids. Mr. Thomson estimates the annual export of plants to Europe at not less than 100,000 for the last twenty years. He also says that "this year several great Orchid growers have requisitioned 250,000 plants." Fifteen years ago this Orchid was obtainable in the Pacho district, the home of the best forms, for a couple of dollars a hundred, when a peon collected as many as 200 a day. Now he collects about ten a day, and consequently the price to him has increased tenfold. In a state of nature, seeds of this Orchid are produced in vast abundance, and being very light and chaff-like are disseminated by millions. Mr. Thomson's suggestion is well worthy of consideration, not only in relation to *Odontoglossum crispum*, but also to many Orchids which are in great demand in Europe, but which are difficult to get from their native countries. With few exceptions, the multiplication of Orchids by the usual methods of seeds, cuttings or division is practically impossible. It would, therefore, be worth while to apply the experiment recommended by Mr. Thomson in the case of various Orchids and in different countries. At present we do not even know whether varieties of Orchids come true from seeds. Such rarities as *O. crispum*, var. *Stevensi*, *O. Pescatorei Veitchii*, *Cypripedium Stonei platytænium* and *C. Fairreanum* would be excellent plants to start with.

London.

W. Watson.

Cultural Department.

Notes on Cherries.

ABOUT ten years ago several varieties of Cherries, chiefly European importations, were received from Professor J. L. Budd, of Ames, Iowa, and planted on the experimental grounds here. Most of the trees have fruited for a number of years, but very little has been published concerning their behavior in this climate. The soil on which they were grown is a heavy sandy loam underlaid with gravel.

As would naturally be supposed, the trees are all perfectly hardy, and have made a good growth. Of nineteen varieties which fruited during the past season only a few possess any superiority to our older cultivated varieties which would warrant a more extended trial. The greater portion of them are in no way better than the old Early Richmond. The following notes were taken during the fruiting season, and are given here for the benefit of those who may wish to plant some of these varieties.

Brusseler Braune makes a larger tree than Early Richmond, and has shown itself to be a heavy bearer. The fruit is large and nearly black when fully ripe; stem two inches long; flesh



Fig. 8.—View in a Grove of California White Oaks, *Quercus lobata*, near Visalia, California.—See page 52.

firm, juicy and of fine quality; juice highly colored. It ripens about June 25th in this latitude, and is one of the most promising varieties in the list. Montmorency probably stands next, with its large, bright red, showy fruit. In productiveness it equals the Early Richmond, but ripens ten days to two weeks later.

Lutorka is a large, bright red cherry with a deep suture, with firm flesh and of good quality, ripening about June 10th. This variety has received favorable comments from growers in the east as promising. So far, with us, it has been a very shy bearer; otherwise it would be recommended for general planting. Griotte du Nord is a good tree, with fine foliage. The fruit is large, almost black when fully ripe; stem two inches in length. It resembles the Brusseler Braune in general appearance, but ripens a little earlier.

Dye House has been spoken of very highly in some localities, but with us it is only medium; no better than many others. French Morello is a large, dark red cherry of good quality and quite productive, ripening about June 25th. Montmorency Extraordinary is of medium size, bright red, good quality, short-stemmed, and ripening June 10th. Frühe Morello is a large, bright red fruit, of fine quality, short-stemmed, quite productive, and ripening June 8th. Späte Morello is a good bearer; fruit medium in size, dark in color when fully ripe. The skin is tough, making it a good shipping variety; ripens June 25th. Wragg makes a low-spreading tree, with fruit of medium size, dark red and of very good quality when fully ripe; ripens June 25th. Weirs No. 2, inferior and not recommended for this locality. Bessarabian would be a fine variety if it were more productive, but thus far it has produced very sparingly. The fruit is large, dark red and of good quality, and ripens about June 20th. Cerise de Ostheim is a round-topped tree, the branches somewhat pendulous in growth. It seems to be one of the best varieties of its class that we have fruited. The fruit is medium in size, of a dark color when fully ripe; flesh firm and tender, juicy and rich, and the tree yields a heavy crop every year. Frauendorfer is a strong-growing tree, with large dark red fruit, tender and juicy. As yet it has not been prolific enough to warrant us in recommending it for general cultivation. Carnation is a sweet cherry of great promise. The fruit is very large, bright red, rich and meaty. It ripens about June 8th, and is a most excellent variety for family use.

La Fayette, Ind.

J. Troop.

Greenhouse Notes.

WHAT may be called the busy greenhouse season is now at hand. In the Palm-house the principal work is cleaning and sponging, preparatory to repotting, and in the Orchid-house potting is the work in order, while in the propagating-house the benches will soon be taxed to their utmost capacity. We usually commence propagating with Crotons, Dracænas and similar greenhouse subjects to give them as long a season as possible. The main trouble in the cultivation of Dracænas is what is commonly known as club-root. This makes its appearance very quickly if the plants are allowed to become stunted in growth, either from the soil becoming sour through an oversupply of water or insufficient drainage, or from excessive dryness. There is no cure for this, so far as I know. When it appears, cuttings should be made of the top and stem and the old diseased root be destroyed.

Rose cuttings should be struck before the sun's rays become too strong, as it is then possible to supply a genial bottom-heat and at the same time keep the atmosphere of the house comparatively cool. The sand must be fresh and clean and kept well moistened until the cuttings have rooted. We prefer thumb-pots for the first potting; the smaller the pot the less is the danger from overwatering before the roots have sufficient strength to use the moisture. A light sandy soil is best for this potting, but for subsequent pottings it should be moderately enriched with dried and finely sifted cow-manure that has been well frozen.

Carnations may be struck, either in a hot-bed or under comparatively cool treatment. We prefer the latter system, for, though it takes longer, better and healthier plants are produced. The hot-bed method rushes the plants into weakly growth from which it takes them considerable time to recover, even if they are removed to cooler quarters after being struck. The first of March is quite soon enough to put in cuttings of bedding plants such as Coleus, Alternanthera, Strobilanthes, etc., unless the stock of any of these is short or extra-large plants are desired. By allowing the stock-plants all the possible light and air now, stout, firm growth will be promoted and the striking will be much easier when the time arrives for it.

Cyclamens still continue to bloom freely. This season,

instead of using leaf-mold and sand as heretofore, for the last shift in September, we substituted a liberal addition of turfy loam for one lot. The experiment was altogether satisfactory, and we mean to grow all in this way in the future. The growth is more compact, the leaves firmer in texture, the flowers stronger and more durable, while the quantity is slightly increased. The young plants from seed sown in October are now ready for a second handling. Frequent shiftings while the plants are young promote compact growth and also prevent the leaf-mold becoming sour or cloggy. As it is hard to regulate the moisture in soil of this nature, the house in which they are grown is run at a night temperature of fifty degrees, a rise of fifteen degrees being allowed by sun-heat. A light sprinkling is given two or three times daily during bright weather. The old plants intended for seeding purposes are kept apart from the others on a shelf well up to the light, and these are labeled in distinct colors so they shall not be mixed. We usually do some hand pollination with a view to strengthening some of the weaker growers or to impart brightness of color to those lacking in that respect. As there is danger from damping during the seeding period an oversupply of moisture must be carefully guarded against.

Cinerarias are now well established in their flowering-pots, and free growth is promoted by frequent applications of weak liquid-manure. The points of the leading shoots were removed before the flower-buds began to show. We consider this operation of considerable importance, as it induces branching and gives a larger and better-balanced plant.

Last year we set plants of Calla out in the garden after they had finished flowering, about the beginning of June, and lifted them again in the fall. They commenced to flower rather earlier than usual under the drying-off system, but otherwise there was no marked advantage. It is a mistake to grow them under too high a temperature, and forty-five degrees by night is quite high enough; at this temperature the flowers will be much stronger and more durable than if grown in more heat, while the plants are less subject to the ravages of insect pests, such as greenfly and thrips. Frequent syringing will help to keep these in check, but if the latter pest gets a footing the leaves must be sponged with a moderately strong solution of whale-oil soap or other insecticide. Smock will destroy the fly, but must not be given too strong; rather make the applications more frequently. These plants are strong feeders, and stand a liberal supply of liquid-manure.

Ferns grown from spores sown in November are now ready for pricking over, and will make nice, useful, little plants for filling small vases by May. Another sowing should be made during the early spring to come in later, as the first lot grow too large for the smallest vases. We use varieties of the Pteris family principally, these being the most durable, but a few Adiantums are also useful. The old plants of the latter should be potted on before the young growth is too far advanced, and Davallias and other rhizomatous sorts should be divided if it is desired to increase the stock by this means.

Tarrytown, N. Y.

William Scott.

Flowers in January.

GREENHOUSE plants toward the end of January have a look of vigor due to the increasing sunlight. The change in the plants is mostly shown in the production of shoots and leaves rather than of flowers. There are not many blossoms except of bulbous plants which thrive in the dark, short mid-winter days, and after about ten weeks of abundant flowering these will continue for, perhaps, a fortnight longer, when a month or two is devoted to the ripening of their bulbs preparatory to a long rest. I still have one much belated flower of *Dahlia imperialis*, a noble species, whose natural blooming time is the end of November. The plant is a fine greenhouse shrub, with the drawback of too tall growth. Its habit is to run up ten or twelve feet, and then form a head of foliage from every axil of which the flower-stalks shoot, each bearing from one to three blush-white flowers; in form these are more like a Lily than a Dahlia, and from four to six inches across. An Italian firm of seed growers state that they have some seminal varieties of this species which are of earlier bloom and dwarfer growth; if their hopes are realized we shall some time have a race of Lily Dahlias for garden decoration. The ordinary kinds are subject to red spider when grown under glass, but this is quite free from the pest.

Lachenalias are mostly past. *L. Nelsoni*, a fine hybrid with a stem a foot high thickly hung with waxy deep yellow bells an inch and a half long, is now in full beauty. This is one of the best in my collection, but it sometimes bears green-yellow flowers. *L. isopetala*, which commonly is the latest to flower, is just beginning to blossom. While not showy, it is quite

pretty with its thickly clustered violet-colored buds and small straw-colored flowers. The procession always begins with *L. quadricolor*, known also as *versicolor* and as *superba*, followed closely by *L. pendula*, the largest and finest of all. About twenty kinds are obtainable, and all, I think, are worth growing.

Oxalis of many kinds continue to flower. *O. Bowiei*, the largest and best species, has been blooming steadily since October, as has *O. cerima*, which I should rank next to *Bowiei*. This species has been introduced into Malta and has become a nuisance in cultivated land, and I read only yesterday that our little American *O. violacea* has become an intolerable pest in some parts of Ceylon. Many of the varieties of *O. purpurea* are now flowering. The flowers are purple, lilac, rose, pink, flesh-colored or white, and are frequently two and a half inches in diameter, but there is only one to the stalk. *O. gigantea* of some catalogues is really *O. purpurea laxula*. The stalks of the leaves and flowers are bright crimson, adding much to the beauty of the plant. Of the flabellate-leaved kinds, *O. crispata*, with its deep yellow flowers, and *O. leperina*, with white ones, are still beautiful, while *O. spectabilis* is just beginning to throw its clusters of dark crimson blossoms up through the masses of deep green leaves.

Hemerocallis fulva is not often seen in winter. Under glass it has a more refined look than out-of-doors, but it does not, of course, warrant the space it occupies. I took in a pot of *H. fulva* two years ago to hasten it for crossing with *H. flava*. I succeeded, and forgot to throw it out again. It has just finished flowering.

Ferraria strata is beginning to open its curious and attractive flowers; so are *Veltheimia viridifolia* and *Dendrobium nobile*, and *Phajus grandifolius* is pushing up its stout flower-stalks. One of the most uncommon plants now in bloom is *Ceratophylla triloba*, a perennial plant from south Africa. It grows in the greenhouse to a height of about two feet and produces spikes of hanging and thickly set flowers, shaped somewhat like those of the Foxglove, but with the lowest lobe prolonged in a triangular or trowel-like shape. These are produced at various seasons; they are pink, marked with darker lines, and are about three inches long. I have tried the plant in the open ground in summer, but it grew so rampantly that fall approached before it was ready to blossom. *Tritonias* are just beginning to flower. Nankin is always the first seedling variety of *T. crocata*; this fine large flower is of a creamy white color, tinged on the edges with red. *Babianias* have little beauty, *Sparaxis* produce but few flowers, *Ixias* are hard to manage under glass, but *Tritonias* are the most satisfactory of the smaller Cape bulbs for greenhouse use.

In speaking of January flowers, the hybrid *Streptocarpus* must not be forgotten, though they are always in bloom. So far I have raised no seedlings which do not fall under one of two descriptions: white, with lines of purple, rose or crimson; mauve, with lines or blotches of violet. This is no great range of color, but they are more distinct than many of the hybrid *Cypripediums* which have received varietal names.

Canton, Mass.

W. E. Endicott.

Sowing Flower Seeds.

IT is not always easy to discover the real cause when there is failure in seed-sowing, and the seedsmen are often blamed when really the cultivator is at fault. Special conditions are necessary for successful germination, and must be maintained during the period intervening from sowing-time. The first thing to consider is whether the seeds are of tropical, semi-tropical or hardy plants, and in this our seedsmen should be able to help us. Seeds of tropical plants require a temperature of at least eighty degrees, Fahrenheit, and moist surroundings. For semi-tropical plants sixty degrees is suitable. A lower temperature will answer for many hardy plants; but the degree of hardness varies as does the vegetating point, and some grow at a temperature scarcely above freezing. When Siberian Squills and Glory of the Snow break through the ground in early spring, thousands of seedlings appear almost at the same time. The effect of temperature on germination is well illustrated by two of our worst weeds, Chickweed, a native of temperate regions, and Purslane, a tropical plant. We have Chickweed from the opening of spring until the middle of June, when Purslane begins to appear and is our worst pest. After the first frost kills the Purslane, Chickweed again becomes troublesome. The shadiest and coolest place must be selected for *Cinerarias*, *Calceolarias* and *Primulas* if these are sown in summer-time, and then only moderate success may follow, whereas, if the sowing is done in February or March, or in September or October, the result is likely to be

altogether satisfactory, because the conditions of heat and moisture can then be made favorable to their nature.

Whether we start our seeds in a cold frame, a hot-bed or a greenhouse, depends on the facilities at hand. A hot-bed may be started now, but a cold frame cannot be brought into successful use until the beginning of April. If I had a greenhouse I would commence seed-sowing now, for, in addition to all tender plants raised for summer display, many hardy annuals and some perennials will germinate as well indoors and have better attention, with the result of earlier flowers. Some hardy perennials require a long time to germinate, and often a whole year will elapse before the seeds come up. Whenever this happens we know from experience that it is better to sow in autumn, and winter the seed boxes in cold frames. Seeds that are slow in vegetating should be sown as soon as they are ripe, or during the autumn. It is probable none will germinate until spring-time. If such seeds were held for spring sowing, few, if any, would come up until autumn, and some would remain dormant for another year. This has happened with *Barberries*, *Clematis*, *Rhodotypos kerrioides*, *Pæonies*, *Hellebores* and *Dictamnus*.

A light, sifted soil, with charcoal dust added, is suitable for nearly all seeds, certainly of all terrestrial plants. Shallow boxes are preferable. We use the shiftings for drainage, and then fill up the boxes to within half an inch of the top with the prepared soil, which is made moderately firm and smooth. Drills are marked out with the edge of a label, and the depth of the drills is varied according to the size of the seeds. Very fine seeds need no drill and may be scattered along the surface. A shaking will generally sufficiently cover them, and the surface should again be pressed smooth. With the exception of very coarse seeds, I do not practice overhead watering, preferring the subirrigation plan of immersing the boxes to the edge and letting in the water from below. Less frequent wetting is thus required and most seedlings will be up before a second application is necessary. There are several ways of disposing of the seed boxes until germination takes place. When space has been limited I have put the boxes away in tiers, so arranged that the bottom of one tier did not rest upon the top of the other—that is, set up so that air could freely pass over the soil. The seeds germinated as well as when the boxes have been spread over more space. By this plan only the top box needs shading, and less watering is required. As soon as germination takes place I expose the young plants to light and air. At this stage they require very careful watering, otherwise they would all quickly damp off. The seedlings should be transplanted as soon as they are large enough to handle.

Among the most useful plants for a summer's display are those which furnish cut flowers. We like to have these as forward as possible. Among these we group *Stocks*, *Asters*, *Coreopsis Drummondii*, *Phlox Drummondii*, *Angelonia grandiflora*, *Salvia Blue Beard*, *Indian Pinks*, *Gaillardias*, *Senecio Jacobæa*, *Scabious*, *Rocket Larkspurs*, *Zinnias*, *Verbenas*, *Chrysanthemum carinatum*, var. *Burridgeanum*, and small *Sunflowers*. All these we shall sow at once in intermediate temperature. Another group, also more or less tender, will include plants useful for the borders or for bedding, such as *Antirrhinums*, *Pentstemons*, *Petunias*, *Begonia semperflorens* *Vernon*, *Salvia splendens*, *Browallias*, *Celosias*, *Balsams* and *Poppies*. If time and space permit it we may sow some hardy perennials in a cool greenhouse. We shall, however, be likely only to try a few novelties or rarities in this way and leave the bulk of the hardy varieties for the cold frame. A good selection of perennials should include some of the fine hybrid *Delphiniums*, particularly *D. formosum*, var. *coelestinum*, *Iris Kämpferi*, *Oriental Poppies*, *Campanula grandiflora*, hybrid *Phlox*, *Pæonies* (these are slow of germination), *Mertensia Virginica*, *Lupinus polyphyllus*, *Trollius Europæus* and *T. Asiaticus*, *Pyrethrum rosea*, *Heuchera sanguinea*, *Dictamnus Fraxinella*, *Sweet Williams*, *Lobelia cardinalis* and some of the new hybrids of *L. fulgens*, *Hollyhocks*, *Foxgloves*, *Asphodels*, perennial *Sunflowers*, species of *Asters*, *Alyssum saxatile*, *Thermopsis Caroliniana*, *Baptisia australis*, *Hemerocallis Thunbergii* and *Coreopsis grandiflora*.

Wellesley, Mass.

T. D. Hatfield.

Notes from Baden-Baden.

Iris Histrio.—Owing to the mildness of the season this *Iris* opened its first flowers by the end of November, and buds are still coming on, prolonging the flowering time to the end of January. It is a native of Mount Lebanon and belongs to the reticulata group, having the largest flowers of this tribe. The body-color of the flowers is bright ultramarine, the three blades having only a colored rim; the middle parts are white,

with blotches of deep ultramarine and a yellow crest. Blue flowers are rare about this time of year, and its fresh color makes it very welcome. It is not quite hardy, and must be either potted or cultivated in a frame, but it well deserves such extra care. Its near ally, *I. histrioides*, is quite hardy, but it does not make its appearance before the middle or end of February, and its flowers are smaller.

A new *Colchicum* from Persia is showing bud and will be out as soon as we get a few bright days. Although its white and pink flowers are small they are borne in great numbers, and on account of their earliness this *Colchicum* will be a welcome addition to spring-flowering bulbous plants. I have been fortunate in securing a small importation of the rare and beautiful *Scilla Messeniaca*, which is to flower in March and on which I will report later.

Baden-Baden.

Max Leichtlin.

Correspondence.

Evergreens in Winter.

To the Editor of GARDEN AND FOREST:

Sir,—Evergreens and shrubs that retain their berries until spring are now the leading attraction of the winter garden. The conifers used to form shrubberies for effect in the dark season should be those that retain a healthy appearance of their foliage throughout the winter. The foliage of many evergreens burns and browns under the varying conditions of sun and storm, freezing and thawing, to which they are subjected at this trying time. For a number of years I have taken note of many Pines, Spruces, *Retinosporas*, *Arbor Vitæ*s and Hemlocks, and I have been much struck by the variety of appearance the different species and varieties assume at this season. In this climate the *Arbor Vitæ*s and *Retinosporas* give less satisfaction than do some other conifers, as they look dull and rusty even in mild winters, and are only beautiful during the season of growth. Such conifers are not as well adapted for winter gardens as the Spruces, Hemlocks and Pines. Strangely enough our native Pines do not compare favorably with those of foreign origin in this regard. In my little pinetum it is the American Pines whose foliage discolors in winter. The common White Pine, *Pinus Strobus*, for instance, has a way of folding its needles together as if it were preparing for a long winter's sleep, and all its foliage assumes a dull olive-gray tint, in striking contrast to the wide-awake aspect and sprightly green of some of its foreign neighbors. *Pinus excelsa*, the Lofty Bhotan Pine, one of the most beautiful of its class, is very effective in the winter landscape here, and is almost as bright a green now as in the summer. The same may be said of *P. Thunbergii*, from Japan, and of the Swiss Stone Pine, the Austrian Pine and others. Our native Cedars, *Juniperus Virginiana*, now have a dark, dingy appearance, which is particularly noticeable when the ground is covered with snow. Some very young trees of this species turn a deep purplish green. In very mild winters like the present the Irish Junipers retain their fresh color throughout the season, but they winter-kill badly from the excessive freezing and thawing of cold changeable weather.

Perhaps the most satisfactory of the conifers in our collection for winter color is the Douglas Spruce, *Pseudotsuga taxifolia*. It certainly is not surpassed by any other known to me for the clear, bright green of its foliage at this time. As grown here it is a compact tree, feathering out quite to the turf with graceful, downward sweep. Its foliage has a peculiar softness to the touch, and it succeeds best on exposed hillsides, where it does not discolor in the severest winter. The Spruces, too, as particularly desirable for winter effects are the Blue Spruce, *Picea pungens*, and a glaucous form of White Spruce, sold under the name of *A. cœrulea*. A variety of the Norway Spruce known as *Conica* has dark foliage and retains its color well, but is not so graceful in habit of growth as some other Spruces.

Hemlocks have a beauty all their own, and are never as charming as when their graceful branches are slightly bent under a light fall of snow. When Bittersweet vines are allowed to clamber at will over a clump of young Hemlocks the effect of the latter is much enhanced by the bright berries that mingle with their airy foliage. *Cupressus Lawsoniana* deserves mention as one of the most cheerful of evergreens as seen here in winter. It is hardy with us and is planted on the crest of a hill, a situation which suits it better than any other.

It may be that in other localities trees which grow dingy here hold their fresh color in the winter. I am only giving my personal observations.

Rose Brake, W. Va.

Danske Dandridge.

Meetings of Societies.

Western New York Horticultural Society.

THE forty-first annual meeting of this society, which stands in the very front rank of organizations devoted to fruit-growing, was, as it usually is, largely attended, and several of the papers were notably instructive. It is said that the meeting did not move with the vim and snap which has characterized the proceedings of this body in years past, and those who have attended former gatherings can hardly imagine a dull hour at one of them. But fruit growers who are cheerful this year are made of sturdy stuff.

ADDRESS OF PRESIDENT BARRY.

After an historical sketch of some of the earlier societies in the country, Mr. Barry spoke of the exceptional weather and the exceptional crops of last season. In the first place, the winter was long and severe, remarkable for periods of extreme cold and heavy falls of snow. In January, while the ground was bare, a period of extreme cold came, in which large orchards of Duchess Pears suffered injury, many of the trees being found dead. Of other varieties of Pears the Anjous suffered least. President Barry does not know whether this injury to the trees will be permanent, but the question of the comparative hardiness of varieties is one which certainly is worth investigating. Snow lay on the ground till late in March and kept out the frost, and on the first of April nurserymen began to lift and pack trees. There was no delay from frost as usual, but there came a sudden and intense heat which prevailed during the middle of the month, with the thermometer in the eighties for several days. This made the packing and the shipping season the most hurried that has ever been known here, for by the first of May every tree was in full leaf, and the season for planting was practically passed. After this abnormal beginning a drought succeeded, with little rain, till the 20th of July, and this resulted in much loss to newly planted trees. The summer was hot, and, although comparatively dry, plants of all kinds which survived the early drought made a growth which surprised every one. For several years in western New York the orchards had produced but light crops, so that the trees were in a condition to yield heavily, and the apple crop was enormous. Every tree which was of bearing age was filled with handsome fruit. The result was surprising and discouraging, since only a small proportion of the fruit brought remunerative prices, most of it being taken to cider-mills or evaporating-houses, or utilized in other ways which gave small returns. Excessive quantities were exported to Europe, and instead of using extra care in selection on account of the exceptional crop, shippers hurried to pack without proper care in selecting, so that in many cases they received hardly enough to pay for their barrels. In this way the crop at home and abroad was practically lost.

President Barry advises that storage houses be provided where fruit can be kept till the time arrives when it can be advantageously sold. He added, as a practical point, that among the varieties which growers in the neighborhood of Rochester had an opportunity to test, Jonathan heads the list as a handsome, delicious and profitable apple. Its size, shape, color, flavor and shipping qualities are all that can be desired, and it is strange that a variety possessing so many desirable characteristics should not have long ago received greater attention. An orchard of Jonathan apples is one of the most beautiful spectacles in nature, the tree being naturally graceful, the branches willowy, and the dark red apples against the bright foliage present a picture which never fails to excite admiration. The President also had a good word for the new plums raised by Luther Burbank, of California. He advised fruit growers to enlarge their spheres of work and to cultivate fruits for different seasons of the year so as to give employment to a regular force of laborers, who, on account of their proficiency, would become indispensable on the fruit farms. Crops should be anticipated and markets provided by the fruit grower, just as the manufacturer seeks and secures sales for his goods. Only by alertness in marketing, as well as care in growing—that is, by conducting fruit-growing on business principles the year through—can success be assured. Under existing conditions it will never answer to leave anything to chance.

NEW FACTS ABOUT THE CODLING MOTH.

Professor M. V. Slingerland, in speaking of recent work among Insect Foes of the Horticulturist, urged all fruit growers to coöperate with the stations, so that practical

horticulturists and economic entomologists could mutually aid each other in studying the habits of injurious insects. After a brief sketch of economical entomology in this country, which began practically with Dr. Harris' famous treatise, published in 1841, science has made great advances. But there are many things to learn. Even when we have discovered the proper remedies, there is sometimes uncertainty as to when and how they should be applied. Besides this, there is more than one fraudulent remedy on the market, as, for example, the inoculation humbug, which claims to render a tree safe from the attacks of many insects by a compound to be inserted in a hole bored into its trunk. Last year thousands of pounds of the American Soil Renewer and Insecticide were sold in Minnesota under a guarantee that it would kill every chinch bug on a field where it was sown, and so impregnate the soil that the insect would never again invade it. Chemists showed that the compound consisted of salt, land plaster and a little hellebore. The experiment stations have shown, too, that a patent Potato Bug Exterminator is entirely worthless, and that some really good insecticides are badly adulterated, so that the practical fruit grower must be alert to keep up with the latest investigations. We are learning something about it every day. For example, the arsenate of lead brought out by the Gypsy Moth Commission in Massachusetts as Gypsine is a promising remedy, so is an arsenite of copper known as Shields' Green and the arsenite of lead. Whale-oil soap seems to be destined to come into general use as an effective remedy for the dreaded San José scale, and with the improved machinery worked by horse power or steam engines there is every promise that it will be possible to wage more successful war against the insect enemies of crops in the future than has ever been waged in the past. Those who know most about insects and their methods of life will be most successful in destroying, and we have much to learn of the habits of our most common ones. We do not know, for example, how long the June bug lives as a white grub, nor the click beetle as a wireworm. We do not know where or when the click beetle lays her eggs, and no one has yet reared a June bug or a click beetle from the egg to the adult insect. Mr. Slingerland has been making a special study of the apple worm, or codling moth, and he seems to have thrown light upon some portion of the life and habits of this insect which have hitherto been obscure. It has been known that a spraying of Paris green, if applied to Apple-trees just after the blossoms fall, will kill the caterpillars; but the explanation as to how this poison killed the worm has been obscure, since no one seems to have made any definite observation of the eggs and the newly hatched caterpillars. The text-books say that "the moth lays its eggs singly in the maturing blossoms of the apple just as the petals fall. As soon as the caterpillar hatches it burrows into the apple." All writers tell glibly where this egg is laid, but only one, so far as Mr. Slingerland knows, has ever seen the egg, and this is remarkable, since the literature of the codling moth began 170 years ago and is as voluminous as that of any other injurious insect. Nevertheless, a bulletin of the Oregon Experiment Station published in 1893 contains the first and only picture of the egg yet published. The author of this bulletin, Mr. Washburn, thought that these eggs were laid anywhere it happened on the skin of the fruit, and they were laid somewhat later than was supposed. Later writers have overlooked these important observations, and Mr. Washburn himself did not watch the young caterpillar after emerging from the egg, and thus left it uncertain as to how he gets his deadly dose of Paris green. Mr. Slingerland has found that the greater part of the eggs are not laid until about a week after the blossoms have fallen and when the apples are as big as hickory nuts. The calyx lobes on the young fruit are by this time drawn tightly together, so that it would be a hard matter for the moth to insert her egg in the cup. In fact, the ovipositor is only adapted to laying eggs on the surface of the fruit. These round, thin, scale-like, translucent eggs, not quite as big as a pin-head, are glued to the apple skin, with little choice as to their location on the fruit. It is a week before they hatch, and therefore it is ten days or two weeks after the blossoms fall before the caterpillar begins operations. Now, if the usual advice for spraying has been followed, the first spraying is made a week before the eggs are laid, and the second some days before the worms appear. How then does the poison kill the worm? A study of the growing fruit shows that when the petals fall the remaining calyx lobes are broadly spread out like a saucer and many minute particles of Paris green are caught in it, but as two weeks must intervene before the little caterpillar begins to eat, much of the poison would be washed out by rain and the first spraying would be

useless. Nature prevents this, however, by tightening up the calyx lobes at their tips as the apple grows, so that within a week after the blossoms fall the cup has its deadly dose protected by a cover formed of these converging lobes. How then does the worm, when he begins to eat a week or more later, get hold of the poison? Professor Slingerland watched one of the little creatures as he came out of his egg and wandered over the surface of the apple for two or three hours, eating nothing, but simply exploring until it had worked its little body through between two of these calyx lobes and disappeared within the cup. Future field work confirmed this observation and showed that the worms fed about the cup for a day or more before they go deeper into the fruit. Apples were picked from a tree which had been sprayed just after the petals fell, and an analysis showed that there was arsenic in the covered cup of the calyx. As eight-tenths of the first brood of worms begin feeding in the manner described it is believed that this first spraying just after the blossoms have fallen is of the utmost importance and will kill more caterpillars than several later applications.

After detailing this bit of investigation and discovery, Professor Slingerland had something to say about the Peach-borer, showing that washes were comparative failures, and that dendrolene, though it gave some promise as a preventive, should be carefully used. He hopes that there will be some easier method found of combating the borer than by digging it out, but as yet this is the surest and most practicable remedy to be commended. A thorough digging in the latter part of June, when the worms are three-fourths grown, would be more effective than a spring and fall examination together.

Recent Publications.

Vegetable Gardening. By Samuel B. Green, Professor of Agriculture in the University of Minnesota. Webb Publishing Co., St. Paul.

This is a compact little manual of 225 pages which was prepared originally for use in the School of Agriculture connected with the University of Minnesota, and it treats of the growing of vegetables both for home use and for market. It was written for the latitude of southern Minnesota, but a little judgment will enable any one to adapt its directions to locations farther south and north. About half the book is taken up with the usual description of the various plants cultivated in kitchen gardens, together with good instructions for raising them. Like most other manuals, it could be improved by the statement of some general principles as the basis of special treatment, so that the cultural directions would have rather less of the wooden "rule of thumb" quality. A handbook would have more vitality and its teachings would impress themselves more strongly upon students if it contained such data, with the deductions from them as were presented, for example, in an article on Tomatoes, by Professor Tracy, in the last volume of this journal (vol. ix., p. 37). When an intelligent reader once apprehends that the constitution and habit of the Tomato clearly make it necessary to surround the plant constantly with certain conditions, he will never forget the details essential to its most profitable cultivation. Similar considerations drawn from a study of the development and character of other garden plants could be stated with great advantage, so as to offer readers for their contemplation and study some of the fundamental reasons for the different methods of treating different crops. Directions given to be memorized are easily forgotten; principles once learned are a possession forever.

The rules for cultural practice, however, are all trustworthy, and embody results of the latest studies at the Agricultural Experiment Stations and elsewhere. Besides these the book offers a good practical chapter on injurious insects and the methods of fighting them, some excellent notes on glass structures, a compact treatise on tillage and fertilizing, with tables of composition giving the amount of food elements required by different crops, the amount of these elements contained in various farm manures and commercial fertilizers, and much other useful matter written in a straightforward, sensible way. It is helpfully illustrated and has a fairly good index, but no table of contents.

Notes.

Almeria grapes, from Spain, may still be had for twenty-five cents a pound, and four-pound baskets of Catawbas, from western New York, sell for the same sum. Handsome bunches of large Gros Colman grapes, from England, realize \$1.75 to \$2.00 a pound.

Only thirty barrels of cranberries reached this city during last week, while 64,000 barrels have come since the beginning of September, besides nearly 35,000 crates. Fancy grades from Cape Cod sell at wholesale for \$5.50, and the best from New Jersey for \$4.00 a barrel.

An important announcement by the MacMillan Company of this city is the publication of an encyclopedia of American Horticulture, in three volumes, dated 1900. Professor Bailey has undertaken the editorial oversight of the work, which will contain signed articles by specialists, arranged alphabetically, on all subjects relating to the cultivation of plants out-of-doors and under glass.

A correspondent of *The Gardeners' Chronicle* from Cape Town, South Africa, writes of a new yellow-spathed Richardia, which seems to be quite different from either R. Elliottiana or R. Pentlandi, and in many respects an improvement on both of them. The flowers are a very bright shade of yellow, the spathes are large and freely borne, the plant is bold, vigorous and stocky in habit, with broad leaves set on rather short petioles and regularly spotted over the entire surface of the blade. The plant is said to have been found in a place remote from the habitat of the yellow Callas already introduced.

Mr. John C. Lewis writes to *Forest Leaves* of a Buttonwood-tree which has grown from a sprout planted by William Rodman about the year 1745, some two miles from the Croydon Station of the Pennsylvania Railroad, at a place called Flushing, in Bucks County, Pennsylvania. It seems as vigorous as it was a century ago, and is still growing and bids fair to keep on growing through the twentieth century. At two feet from the ground the tree is twenty-nine feet six inches in girth, and at six feet from the ground it measures twenty-eight feet four inches. If there are larger trees than this east of the Rocky Mountains we should like to hear of them.

According to Mr. Fernow, in an address before the New Jersey Forestry Association, held at Trenton on the 5th of January, the people of New Jersey are sending out of that state at least twelve million dollars a year for lumber, two or three millions of which could be expended at home if the soil fit for these crops only was doing its duty. The greater portion of this area is almost totally unproductive, and its capacity for production is decreasing every year by recurring fires. One-third of it is in the northern or hilly part of the state, and the remainder in the sand-barrens so situated near places of active consumption that, with only indifferent care, it would yield a hundred million cubic feet of wood every year forever, or an annual stumpage value of at least one million dollars.

While only a moderate quantity of fresh vegetables arrived from Florida last week, there was no real scarcity. The crops north of Winter Haven are said to have been seriously injured by the recent frosts, but south of Tampa little damage was done. Some good lettuce has come from that state during the past ten days, with new beets, cabbage, eggplants and cauliflower. Many of the tomatoes have been of poor color, but good ones could be bought as low as twenty cents a pound. String-beans cost \$1.00 a half-peck, and peas \$1.00 to \$1.50. Escarolle, from New Orleans, costs ten cents a head, and that from France commands twenty to twenty-five cents. Okra and peppers come from Havana. Mushrooms continue plentiful at fifty cents a pound. Oyster-plant, turnips and other root crops are seen in large variety in local displays of vegetables.

Messrs. J. C. Houghton & Co., importers of apples in Liverpool, under date of January 30th, state that the favorable change of the previous week in prices for American apples in England has continued, and that there is a further general advance of one to two shillings a barrel. At that time Baldwins of choice quality, tightly packed and sound, sold at wholesale at from \$2.88 to \$4.08; Greenings, from \$2.46 to \$3.54; Northern Spies, \$2.52 to \$3.84, and Golden Russets, \$3.54 to \$5.04. "Slack" barrels realized from one to three shillings less than these rates. Other varieties now exported from this country are Ben Davis, Phoenix and Seek-no-further. Most of these apples were forwarded from Maine and Canada, and the few from New York are reported as having been in poor condition, Baldwins bringing but \$1.68 to \$3.00, and

Golden Russets \$3.36 to \$3.48. In Liverpool alone 1,235,925 barrels of American apples were received this season up to January 28th as against 329,126 barrels for the corresponding period a year ago.

Dr. John Marshall, of Philadelphia, who has his summer residence in Douglassville, Pennsylvania, came home after a short absence and found that a telegraph company had entered his grounds against the protests of the persons in charge, and cut down sixty or seventy trees and mutilated others, under the pretext of clearing a space for operating a telegraph line. Suit was brought in the Bucks County Court, and the men who committed the misdemeanor were sentenced to pay a fine of \$50.00 each, and in default of payment to be imprisoned for fifty days. An appeal was taken to the Superior Court of Pennsylvania, and we are glad to learn from *Forest Leaves* that the finding of the lower court was upheld. Beyond doubt, the owner of the trees has also the right under this decision to collect damages by civil suits in addition to the penalties imposed for the misdemeanor.

A correspondent to the London *Garden* says that Beet roots are often spoiled in cooking—that is, the most highly colored of them lose their beauty and the richest of them lose their flavor. In the first place they may be injured in gathering, for if the tops are cut off too close to the crown the root bleeds and this is a loss, and when sent to the kitchen in good condition the knife is too severely used in trimming off the ends before they are boiled. Besides this, they are often pricked with the fork to prove that they are sufficiently soft, and in this way the juice escapes into the water to the detriment of both flavor and color. Experienced cooks ought to know how long roots of a certain size require for their cooking, and they should never be interfered with from the time they are placed in the water until they are finally removed, when they should be peeled and prepared for the table.

The Trustees of the Veitch Memorial Fund have selected for decoration with their medal this year the following persons for distinguished service to horticulture: Mr. Norman C. Cookson, for long and successful experiments in hybridizing Orchids; Mr. Martin R. Smith, an eminent amateur, for raising choice varieties of Carnations, especially those in the Malmaison section, and others adapted for culture in the open border on account of their hardiness and beauty; Professor L. H. Bailey, of Cornell University, in recognition of the value of his lectures and writings as a help in placing the cultivation of plants on a scientific basis, and his efforts to promote the extension of horticultural education, and for his efforts to improve economic plants; M. Charles Naudin, of Antibes, for experiments which have advanced the theory and practice of hybridization, and for his success in introducing plants of great economic value; and Herr Max Leichtlin, of Baden-Baden, for his eminent services in introducing to horticulture a large number of interesting plants, and his sagacity and skill in their cultivation.

In writing to *The American Agriculturist* on Winter Work Against Insects, Professor J. B. Smith calls attention to the fact that many borers pass the winter as larvae either in dead or dying twigs that remain on the trees or have fallen to the ground. All dead and dying wood should, therefore, be removed from orchards in the winter. Almost every dead or dying branch contains borers in some stage, and these should find their way to the brush-heap or into the stove before spring. If they are put on the brush-heap they should by no means be allowed to lie till the following summer, but ought to be burned before the first of April. Careful inspection at this season may show on Apple-trees which have been infested with plant lice many very small, shining, black, oval eggs close to the buds near the tips of the twigs. It is hard to kill these eggs, but if there is any trimming to be done these twigs may be cut off and burned before spring, and this will lessen the insects for next year. The egg belts of the tent caterpillar are more readily seen, and it pays certainly to cut them from medium-sized trees. Burning over infested land in winter will destroy the eggs of many grasshoppers and other insects which lay their eggs in the leafy tissue or on the stems of grass or reeds. Some insects which infest shade-trees, like the bagworm and the vapor moth, hibernate in the egg state. The bagworm can be easily cut off of the tree, especially the Arbor Vitæ, which is very subject to their injuries, while in cities and towns the egg masses of the vapor moth are found on fences, tree-boxes and any other place where a little shelter is afforded, and since each mass contains more than a hundred eggs, every one gathered and burned helps to limit the injury from caterpillars the next year.

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Agricultural Education.

AT one of the meetings of the Association of American Colleges and Experiment Stations a committee was appointed to examine Methods of Teaching Agriculture, and at the convention held in Washington last November the first report was submitted, and this has been published in full as circular No. 32 from the Office of Experiment Stations, in the Department of Agriculture. The first point to note is that a tabulation and summary of the replies sent from fifty agricultural colleges in response to letters of inquiry show that in this country, at least, there is nothing like a standard for instruction in agriculture. This does not mean simply that there are differences in the methods pursued in the various colleges which arise from different conditions; it means that there is no approach to anything like uniformity in courses of study or in the method of pursuing them. These colleges differ so widely in the topics taught, the order in which they are taken up, the time given to each one, and in the adjustment of the proportion of work in the class-room to practical work in the laboratory or on the farm, that it is almost impossible to compare one institution with another, or any of them, with a typical scheme for a regular course of three or four years. The committee, therefore, present their summary of data with the negative conclusion that they are not prepared to make any recommendation until more time has been taken to study and digest the facts presented. Indeed, the committee point out that the subject can hardly be discussed intelligently until there is a definite nomenclature in regard to the methods of agricultural teaching. The term "agricultural" is applied in a broad way not only to plant production, but to animal physiology, various special industries like dairying and sugar-making, to farm engineering and mechanics, to farm policy, including rural law, agricultural bookkeeping, etc. How the various subdivisions of the general subject are to be named the committee has not yet decided.

But, apart from the summary of data concerning our own colleges, there is an instructive series of observations upon the leading features of European institutions for agricul-

tural education. From this we find that the systematic efforts to educate people in agriculture in Europe are much more complex than ours, ranging from elementary instruction in the public schools up to post-graduate courses for those who have already taken the university degree. Beginning at the bottom, in many European countries there are (1) farmers' meetings like our own farmers' institutes, held for a day or so, at which there is a lecture or two and a conference, (2) short courses of lectures on special topics and on the general subject of agriculture, (3) evening schools for elementary instruction, (4) classes in agriculture in public or private primary schools, (5) courses in the normal schools to train agricultural teachers for primary schools, (6) courses in agriculture in the secondary public or private schools for general education, (7) schools of a higher grade managed by individuals or corporations and subsidized by the Government, (8) schools of the same grade, but exclusively under the Government control, (9) institutions for higher education in agriculture only, (10) the same kind of institutions, but connected with universities, and lastly, departments in the universities themselves. The special thing which arrests attention is the relatively large place given to the higher, or what we should call post-graduate education in agricultural science. Opportunities are offered for thorough training in any or all the sciences as applied to agriculture. The result of this is that the experiment stations, the schools of agriculture and the agricultural departments of the Government never lack for well-trained investigators or teachers, and, besides this, industries like sugar-making, which require scientific knowledge of a high order, can always find skilled laborers.

This is the most important feature in the whole system. Improvements in education usually begin in institutions of the higher grades; good primary schools, at least, only flourish in conjunction with the best institutions of the highest grade. It is the colleges where teachers are educated, and the higher institutions of learning which furnish an educated public opinion that make good schools of a lower grade possible, and until we have institutions where a body of workers can be trained to agricultural research our whole system, from the primary instruction in agricultural science upward, will be structurally weak. Of course, as it is stated in this report, some of our workers and teachers can get their training in foreign schools, but, while this is better than no training at all, they acquire a certain alien habit of thought which is a bar to their highest success at home. In our own country the conspicuous improvements in agriculture have been made by investigators in scientific fields. Our marked advance in fruit-culture has been due to the discovery of methods for checking the ravages of insects and of fungous diseases. Great improvements in dairying have been made by the chemists in our experiment stations, and a more rational system of animal feeding, which has added millions of dollars to the value of our stock-raising interests, has come from the same source. It would seem, therefore, that one of our first efforts should be to raise the standard of our colleges of agriculture so that they may turn out a class of men who have a broad grasp of the entire subject and are capable of making original investigations in the various sciences which are connected with the general subject; and before students are capable of making the most of a really high-grade course in agriculture they must, beyond question, have a thorough college training in the principles of the various sciences which underlie agriculture.

At the other extreme of the educational system, that is, in the primary schools, the first necessity is competent teachers. How children may receive elementary instruction in ordinary schools is well set forth in the account of a visit to a school in Belgium which has a well-equipped teacher. At the time of this visit the teacher was giving a lesson on the properties and uses of milk to a class of boys and girls about twelve years old. By means of elementary chemical experiments and skillful questions, with samples

of milk and cream in their presence, and much material illustrating the composition and uses of the fluid, the teacher gave to his class a simple and clear explanation of such matters relating to the uses of milk and its composition as they could reasonably be expected to understand, and as the different members of the class summed up what they had listened to it was apparent that they were well taught and that from that time forth their knowledge of milk was considerably wider than it would have been if they had never received the lesson. The teacher had hung charts about the walls of his schoolroom, pictures of agricultural implements and of different plants, and adjoining his school was a small garden in which many kinds of plants were growing, and where different methods of cultivation were tried for the instruction of pupils. The teacher was not a mere book man. His schoolroom was close by the rooms of the village agricultural society, where there were collections of seeds, charts with the composition of different fertilizers, and many other things which would be of interest in the discussions of the society, and which were available for use in the school. He was secretary of this society. He had aided the farmers in fitting up a coöperative dairy supplied with the most approved appliances for the creamery business, and by selecting, testing and purchasing fertilizers for them, and in many other ways. It was very plain that children trained under such circumstances would have a much broader outlook relating to agriculture, and be more inclined to avail themselves of advanced methods in agriculture than their fathers had been. Of course, it will be many years, if not generations, before we can hope for teachers of this sort in our country primary schools. Undoubtedly they are rare, too, in Europe, for only a beginning has been made in Germany, for example, to provide instruction in agriculture in normal schools.

We have no space to speak of the so-called secondary schools or schools of higher grade which are well provided with apparatus, collections of various sorts and material for illustration, nor of the institutions for higher agricultural education in many European countries. We can only say that it is not considered so important in these latter institutions that students shall learn definite things as that they shall acquire scientific methods of thought, and that the best educators are by no means certain that their systems cannot be largely improved. It will be a long time before we can have anything like systematic agricultural education either in common or high schools, and the most that we can hope is that by means of institutes and bulletins and the agricultural press the results of our experiment station work can be made directly useful to the farmers of the country, and that the character of this work can be made better and better. We cannot but feel, however, that an elementary knowledge of plant-growth and of other processes of nature will sometime be considered a natural part of the education of all boys and girls in the country, and this not simply because it will make them more successful farmers or fruit growers or truck raisers, but because as a matter of mental discipline it is an excellent schooling for anybody, helping to train the mind to habits of observation which can be used in any field of life, and giving a knowledge of facts and processes which will furnish pleasure and entertainment in all after life, even if it is not made directly profitable in work on the farm or the garden.

When a rock of any kind has lain for some time exposed to the weather, Nature finishes it in her own way. First, she takes wonderful pains about its forms, sculpturing it into exquisite variety of dent and dimple, and rounding or hollowing it into contours, which for fineness no human hand can follow; then she colors it; and every one of her touches of color, instead of being a powder mixed with oil, is a minute forest of living trees, glorious in strength and beauty and concealing wonders of structure.—*John Ruskin.*

Notes on the Eastern American Spruces.

IN the new *Illustrated Flora of the Northern United States and Canada*, by Dr. N. L. Britton and Hon. Addison Brown, the Black and Red Spruces are maintained as distinct species, but there seems to be an unfortunate and, perhaps, accidental confusion in the description and a transposition of the figures. These two Spruces and the White Spruce comprise the only species recognized in eastern North America. In many of the modern writings, whenever the Red Spruce has been recognized at all, it has been merely mentioned as a variety of the Black Spruce, and the characters which distinguish it have sometimes been very vague. In the last edition of Gray's *Manual* the variety is better characterized than in any of the earlier editions.

With our present knowledge of these trees they appear as distinct species, although it is true that individuals apparently more or less intermediate in their superficial characters are not unusual.

The late Dr. George Lawson, of Halifax, Nova Scotia, in a little paper on the Canadian Spruces, read before the Royal Society of Canada in 1887, and apparently privately printed, probably did more than anybody else to call attention to the differences between the species. This paper has been reprinted by Professor Penhallow in the *Canadian Record of Science* for July, 1896. It appears that the Black Spruce, generally known as *Picea nigra*, was first described in the eighth edition of Miller's *Gardeners' Dictionary* (1768) as *Abies Mariana*, "the Black Spruce Fir of North America, with very small cones," and although the description is not very specific it may stand for the Black Spruce as now recognized.

In New England and New York, and in the adjoining states to the south and west, this tree is less abundant than the Red Spruce, although it may be found in most regions in which the latter grows. The Black Spruce, however, is generally found in bogs, on the colder boggy lands, around the shores of lakes, or wet places on hills and mountains; the Red Spruce, on the other hand, being found on the better-drained or warmer lands, whether in valleys or mountain slopes. In many localities the two species may be found intermixed or close side by side, and in some places the Black, Red and White Spruces may be found together, as, for instance, at Kineo, at Moosehead Lake, in Maine. Under favorable conditions the Black Spruce may become a tall slender tree, but in its best development it is smaller in size of tree, limb, twig and cone than the Red Spruce. Growing in open places it may be furnished with branches to the ground, but the branches are generally shorter, more slender, and therefore more drooping, than than those of the Red Spruce. The branches are less regular in their growth—that is, they are not so uniformly graded in length from base to summit—which often gives the tree a straggly appearance and less of the regular conical aspect of the Red Spruce. As a rule they are much depressed instead of horizontal. The twigs are pubescent, with fine rusty brown hair or occasionally nearly glabrous, and are generally of a darker, duller red-brown color than those of the Red Spruce; and they are commonly more slender, the lateral ones becoming depressed or pendent.

The leaves generally seem shorter and less pointed than those of the Red Spruce, and they stand more erect or brush-like on the twigs. The distinctly dark blue-green or glaucous color of the foliage at once distinguishes it from the Red Spruce and gives it more of the aspect of the White Spruce, with which it has occasionally been confounded. On the tops of the trees or on the fruiting branches the leaves are often shorter and blunter than on the lower or non-fruiting branches.

In cold, wet, spongy, sphagnum bogs, where there is no real soil and the sphagnum sinks below water-level when trodden upon, the trees may be found bearing cones when less than three feet high and with stems less than an inch in diameter. Such diminutive trees may be many years old, scores of years old in fact, and are to be found in

their peculiar situations in Maine, New Brunswick and other parts of Canada, where they are often known as Water Spruce. On the firm ground adjoining such bogs the same species of tree grows to normal size.

The cones of the Black Spruce often seem clustered together in bunches, and they usually remain on the trees for several years after they are mature. Sometimes cones of the different seasons for the past twenty or thirty years may be found still persisting on the older trees, generally on the inner ends of the branches near the trunks. The mature cones, which are attached to the twigs by short, stout, recurved stalks, are generally ovate in form and have been well described as plum-shaped. When open they often appear nearly globular in outline. They average nearly an inch in length, but are often much less, and are occasionally as much as an inch and a half long. When young they are of a rosy purple or dark purplish color, changing with age until they are of a duller or more gray-brown color than those of the Red Spruce when both arrive at maturity and the cones open. The scales are rigid, are very thin and often pale-colored at the outer ends, which are sometimes quite narrow, and where they also often seem wrinkled, and the edges are quite distinctly uneven, eroded or notched. The cones do not open so freely as those of the Red Spruce and the scales do not allow the seeds to drop out easily or soon. The Black Spruce is the Muskeag Spruce, described and illustrated from a photograph, by Mr. H. B. Ayers, on pages 504 and 505 of the seventh volume of GARDEN AND FOREST.

The Red Spruce (now known as *Picea rubra*, and hitherto most frequently called a variety of *P. nigra* or *P. Mariana*, as it is now proposed to call *P. nigra*) is the principal Spruce timber-tree throughout the maritime provinces and eastern Canada, throughout Maine and the other New England states, New York and Pennsylvania, and extends farther south and west. Under most favorable conditions, as in the Adirondack forests in New York, it may attain a height of considerably over one hundred feet and a diameter of trunk of over three feet, although the average size as cut for timber is much less. A count of the annual rings shows the older trees to be more than two hundred and occasionally three or four hundred years old. Interesting tables of heights, diameters, age, etc., of a large number of specimens cut in the Adirondack forest, and excellent photographs, may be found in the Report of the New York State Forest Commission for 1894, where the monograph by Mr. W. F. Fox on the Black Spruce refers to the Red Spruce as now understood, and which is also locally known as Yellow Spruce. On high mountains, at the limit of tree growth, the Red Spruce may be reduced to a low plant scarcely rising above the shelter of the rocks. Growing in the woods the Red Spruce becomes a tall, straight tree without living branches, except on the upper part; in open places it may grow up symmetrical in form and covered with nearly horizontal branches to the ground. The general color of the foliage is dark yellowish green, varying to dark green, in this respect resembling the commonly planted Norway Spruce or the Oriental Spruce, *Picea orientalis*, more than any of our native species. The leaves are either straight, or nearly so, or more commonly decidedly curved or bent and appressed toward the tips of the twigs. The small twigs average stouter than those of the Black Spruce under similar conditions, and they are not so inclined to droop or be so pendulous. The bark of these young twigs is of a brighter reddish brown color and is more or less densely covered with minute brown hairs.

The ripe cones, before opening, are oblong or oblong-oval in form, the middle, or the upper half stoutest, and tapering to the apex from near the middle, instead of being slender and nearly cylindrical, as are the cones of the White Spruce, or plum-shaped or ovate like those of the Black Spruce, and they have very short curved stalks, shorter than those of the Black Spruce. They seem to be borne nearer the tips of the branches than the cones of the Black Spruce, and rarely persist on the trees longer than

the second summer. On different trees the cones may vary from an inch or an inch and a quarter, to two or occasionally nearly two and a half inches in length. They may be green or purplish in the growing condition, but as they become ripe and dry and the scales separate they lose their purplish aspect and change to a bright reddish brown color. The scales at the apex are broad, rounded or rarely obscurely pointed, and they are quite firm and rigid, and have edges entire or only minutely eroded or notched.

Lambert, in his monograph of the genus *Pinus*, published in 1803, appears to have given the first unmistakable figure of the Red Spruce, accompanied by a description which is relatively not so good as the figure. To this species, in accordance with the generic classification of the time, Lambert gave the name of *Pinus rubra*, which was afterward placed in the genus *Picea*. As Miller, in his *Gardeners' Dictionary* (eighth edition, 1768), previously used the name *Pinus rubra*, and seems to have applied it to *Pinus sylvestris*, the Scotch Pine, it is likely that our Red Spruce is to be burdened with another name to conform to rules adopted by some of our botanists. It may be that the name *Picea Canadensis*, applied to the next species by Dr. Britton, rightfully belongs to the Red Spruce. If the name *Picea rubra* must be done away with, and if the name *P. Canadensis* cannot be applied to this species, perhaps botanists may see the propriety of taking up Muenchhausen's name (*Pinus Abies acutissima*; *Der Hausvater*, vol. v., p. 225, 1770) if it is conceded that he was describing the Red Spruce. The species would then become *Picea acutissima*, a name much less appropriate than the one by which it is now known. Muenchhausen describes the tree as having reddish bark, but otherwise much like the Black Spruce, of which he also considered the Red and White Spruces as possible varieties. He gives as English names of the Red Spruce, "The Red Spruce Fir, or small-coned Virginia Fir, the new Scotia Fir with oblong cones."

The third Spruce of eastern America is the White Spruce, *Picea alba* of most botanists, and which may be changed to *P. laxa* if the name *P. Canadensis* does not surely belong to this species. It is locally known in New England as the Bog Spruce, Cat Spruce and Skunk Spruce. The last two names have been given on account of the strong peculiar odor of the foliage when rubbed or bruised, or which, in certain states of the atmosphere, may be detected at some distance from the trees. This species is native only in the northern United States and in Canada, extending from the Atlantic coast far westward.

Dr. Britton, in the *Catalogue of Plants growing within one hundred miles of New York City*, published in 1888, and in his new *Flora*, has fastened Miller's earlier specific name of *Canadensis* (*Abies Canadensis*, *Gardeners' Dictionary*, eighth edition, 1768) to this species; but, except for the fact that Miller calls it the "Newfoundland White Spruce Fir," there seems to be no more authority for applying Miller's name to the White Spruce than to the Red Spruce. Indeed, the brief description might apply to either species. Moreover, Miller, who did not recognize the Red Spruce as such, also says that his species is used indifferently with the Black Spruce in the manufacture of spruce beer. Now, it is well known that the White Spruce, on account of the strong disagreeable odor already mentioned and the equally unpalatable flavor, is never used in making spruce beer. As what is called White Spruce in many English collections to-day proves to be our Red Spruce, there is good reason to believe that Miller had the latter before him when he wrote his description. In addition to his description he gives a figure of the species in his *Figures of Plants*, published in 1771 (vol. i., plate 1), and, although very poor, this certainly bears more resemblance to the Black or Red than it does to the White Spruce. In this volume, page 1, he says, "the leaves of the Black sort are whiter on their under side than those of the White," and also that "the White is always found growing naturally on the mountains, and the Black upon the low grounds, generally in bogs or swamps. The first is by much the largest tree." These comparisons are

quite applicable to the Red and Black Spruces, and his further statement that "the cones of these trees were sent from Virginia by Mr. Banister toward the end of the last century," points to the Red Spruce, for he would hardly have obtained the White Spruce from the region indicated, even allowing for the very large and indefinite Virginia of those early days.

The evidence attainable certainly seems to show that the name *Picea Canadensis* should be transferred to the Red Spruce, and that the White Spruce should be called *P. laxa*, as proposed by Professor Sargent (*GARDEN AND FOREST*, ii., 496.).

Besides its peculiar odor and flavor, the White Spruce is distinguished from the Red by its distinctly glaucous or dusty-looking foliage and by having leaves longer and generally more pointed than either the Black or Red Spruces. The twigs are stout and rigid, pale greenish white, and are glabrous or without the hairs which are found on the other two species. The mature cones on different trees may vary from an inch and a quarter to two inches and a half or more in length. They are slender and more or less cylindrical or finger-shaped, green while growing and pale brown when ripe and dry. They appear sessile on the tips of short twigs and ripen early in the autumn, when the scales separate and allow the seeds to escape. The scales are quite broad, and are either rounded or truncate, or even slightly retuse at the apex. They are smooth, and the edges are entire and not notched or eroded, although some of the scales are occasionally split down the middle of the outer end. They are very thin and pliant, and the whole open cone is easily crushed in the hand, unlike the scales of the cone of either the Red or Black Spruce, which are firm and rigid and not easily crushed down after the cone is dry and open.

Growing in open places the White Spruce becomes a large tree of symmetrical conical form with horizontal branches from base to top. As in the case of the Colorado Blue Spruce, the glaucous or "blue" character of the foliage may vary considerably in different individuals, some trees showing it in much greater degree than others. Rarely, specimens of the Red Spruce may be found having a slight glaucous hue. The leaves of all the species vary greatly in length, thickness and sharpness of their points according to the part of the tree upon which they grow, to environment, to the age of the trees and to other conditions.

The winter buds of the White Spruce are usually of a lighter brown color than those of either the Black or Red Spruces, and are larger and composed of broader scales, which are generally loose or flaring at the tips, while those of the other two species are much darker-colored, are smaller, and have narrower, more closely appressed scales, so that their buds are more conical or pointed.

While the specific differences are so confusing in the early as well as some of the later literature on the Spruces, the three species are well figured in the first volume of Lambert's splendid monograph, which was published in 1803. Plate 28 shows the Red Spruce, which was figured from specimens grown in England at that time, but on the same plate are two "ripe cones imported from America by Mr. Loddige," which seem much like those of the White Spruce. The three species are also well represented in the *Pinetum Woburnense*, published by Forbes in 1839.

Arnold Arboretum.

J. G. Jack.

New or Little-known Plants.

Aster junceus, Ait.

THOUGH a rare plant in the United States, *Aster junceus* has been better understood than the related *A. longifolius*, which was discussed in a recent number of this journal (vol. ix., p. 507). In 1841 Torrey and Gray gave to a discussion of this species, then treated under *A. laxi-*

folius, Nees, a full page of their *Flora of North America*, and to-day, with additional material at hand, there is little to add to their characterization of the plant.

Like *Aster longifolius*, this species is of northern range, but it extends farther south, to central New York, Ohio, Michigan, Wisconsin and the Black Hills of South Dakota. It is generally found in sphagnum swamps or on gravelly shores, though it sometimes grows on drier soil. From a large number of herbarium labels it would seem that *A. junceus* has a remarkable period of bloom, from late June to early September, a habit which was long kept in mind by the name *æstivus*, applied to this plant.

Aster junceus is ordinarily a well-marked species. The smooth or slightly pubescent, or even roughish, stems are very slender, growing from one-half to three feet high. The thickest leaves are linear or elongate-lanceolate, attenuate to the tip, but hardly narrowed below to the sessile base; the cauline are from two to six inches long and from one and a half to four lines broad; the floral are much reduced. The leaves are, further, quite entire, or sometimes a little serrulate, the margins generally being recurved and strongly ciliate-scabrous. As in *A. longifolius*, the branches of the inflorescence vary in length; the heads may be few or solitary on the short branches, or loosely panicleate at the ends of the slender, almost naked branches. The heads are about three-quarters of an inch across. The involucre is three or four lines high, of about three series of slightly imbricated, erect, linear or linear-lanceolate bracts with acute or attenuate herbaceous tips. The rays vary in color from white through pink and crimson to deep violet-blue, but commonly they are pink or crimson.

Though *Aster junceus* approaches *A. longifolius* in some of its forms, it can generally be recognized by its lower and more slender habit, narrower, thickish and scabrous leaves, and by the shorter imbricated involucre with no enlarged outer foliaceous bracts.

Mr. Faxon's drawing (see fig. 9, p. 65) was made from a specimen collected at Fort Fairfield, Maine, where, in early September, with the dim purple spires of *Prenanthes racemosa*, the creamy white stars of *Parnassia* and the golden-yellow masses of the shrubby *Cinquefoil*, this *Aster* makes of the gravelly intervals of the Aroostook River a garden of delights for all botanists who have found their way to that favored region.

Gray Herbarium, Cambridge.

Merritt L. Fernald.

Ipomœa Briggsii.

THIS plant, introduced a year or two ago, has proved a first-class winter-blooming climber, but so far, in this neighborhood at least, it has resisted all efforts to induce it to bloom out-of-doors during the summer. This failure to show summer flowers is not to be regretted very much since it does so much to brighten up the conservatory during the dull season. Last spring I planted several good-sized tubers out-of-doors in company with other tuberous sorts. *Ipomœa Briggsii* made splendid growth, but no appearance of bloom; about the beginning of October the tubers were carefully lifted and put in pots, some of the branches which had got mutilated in the operation were removed, or where these were too numerous for the roots to carry over after potting they were thinned out a little. A sunny position was given to the plants in the Begonia-house, where in a few days the shortened growths freshened up. A few new shoots started out, and then from the axils of the leaves the flower-buds began to show. It is now three months since the first flowers opened, and several flowers have expanded on each plant every day since. Unlike our summer-blooming *Ipomœas*, which close their flowers early in the day, those of *I. Briggsii* remain open all day long.

This species resembles *Ipomœa Horsfalliæ* to a certain extent. Its flowers, however, are smaller, and their color may be called a rich magenta crimson. Next season I intend

Fig. 9.—*Aster junceus*, Alt.—See page 64.

to grow it in large pots plunged out-of-doors, so that the plants can be removed to the greenhouse without having to cut any of the branches. Cuttings of the ripe wood root much more readily than those of *I. Horsfalliæ*.

Botanic Garden, Washington, D. C.

G. W. Oliver.

Cultural Department.

Propagating Plants by Cuttings.

THE propagation of plants by means of cuttings or slips is the simplest and best known. Almost all plants can be multiplied in this way when properly treated at the right time.

In any special instance one ought to know the conditions under which the plants exist, especially as to temperature; and the season of active growth, for this is generally the best time to start the cuttings or slips, especially of the so-called soft-wooded plants. There are some exceptions among hard-wooded plants, which seem to need a longer period of preparation or callousing. We can strike cuttings almost any time from the growing shoots of Roses, but slips of ripened wood must be treated as we treat Grapevines and Currant prunings, by putting them in sand in cold frames or cellars to callous over winter. A large number of hardy shrubs can be propagated in this way, and we get larger plants in less time than when we use the soft growth. Whenever soft tips fail to root it will be well to try ripened wood in the way suggested.

Soft-wooded plants are propagated mostly during winter-time. In many large establishments only poor provision is made for propagating. It is not at all uncommon to see cuttings standing in pots on ordinary greenhouse benches, under adverse conditions, making a struggle to gain a root-hold. No greenhouse should be without a corner properly fitted for rooting plants. This can easily be done. In the majority of places, the benches are of wood or slate slabs, and if we would enclose a section of a bench by boarding up the under part we could get sufficient warmth even for tropical plants. Slides will be required to regulate the temperature. Our benches being of concrete we could not adopt this arrangement, and in such cases the best plan is to tap the heating system and carry a coil of three-quarter-inch pipes above, so that they rest on the table. These pipes must be boarded over so as to enclose an evenly heated air-space, which in turn evenly heats the bed of propagating sand above it. This is better, of course, than to run the pipes directly through the bed. Above this platform a part of the bench boxed in holds some four inches of sand. The box may be finished neatly or spanned by sheets of glass, movable as occasion requires. By a valve arrangement we are able to regulate the amount of bottom-heat to a nicety. In selecting a corner one should choose the shadiest and, if possible, the coolest place. Practical experience has shown that successful propagation requires that the temperature of the air should be about ten degrees lower than that of the soil or sand in which the roots form. A cool house enables us to make these conditions better than a warm one. A bottom-heat of sixty-five degrees, Fahrenheit, with an overhead temperature of fifty-five degrees, will suit all but a few tropical plants. The object should always be to develop as many roots as we can with as little excitement as possible of stem and leaf growth. A soft, spindling growth is least desired, but always results when we use a close, stuffy propagating bed.

Medium sand, neither coarse nor soft, is best. I avoid red sand. For winter and spring work we like our sand as free from clayey or loamy ingredients as possible, though for summer use a slight percentage is advantageous. It should be packed firmly.

In the preparation of cuttings the old practitioners used to hamper their work by much detail. It was not supposed that a cutting could root unless taken off at a joint, and even to-day some growers are possessed by the same delusion. Special care is needed with some kinds of plants. Cuttings must be selected and be at just the proper condition of ripeness, but with the majority of the plants propagated cuttings made of sturdy growing shoots are almost sure to root, no matter where we cut them. All that is necessary is to see that they are properly inserted, and with as little delay as possible. They should be cut clean, shorn of a few of the bottom leaves and made firm in the sand. Abundance of water must at once be given and the bed well shaded, for on no account must the cuttings be allowed to wilt.

Of soft-wooded plants it will suffice to mention a few which require special preparation or to be in a certain condition of ripeness. Growing side-shoots of *Ficus elastica*, taken with a heel, root more quickly than the tips. It is possible, also, to root separate eyes of these, but it takes a very strong bottom-heat of eighty degrees to start them into growth even when rooted. *Daphne indica*, *Cytisus*, *Azaleas* and *Acacias* root best from half-ripened shoots taken with a heel. To propagate these in quantity it is a good plan to prune an old plant closely and take the fresh shoots as they come from the older wood. *Euphorbia* (*Poinsettia*) *pulcherrima* and *E. fulgens* root best from soft shoots, also taken with a heel. Old plants of these kept in a dormant condition until the opening of spring, and then planted out when settled weather comes, furnish abundance of cuttings all through the summer, and from these we get a lot of various sizes. *Dracenas* of the *Cordyline* section seldom fail to root when the tips are taken as well as by division of the stem and root.

Wellesley, Mass.

T. D. Hatfield.

Greenhouses for Amateur Gardeners.

THIS is the season of the year when plants commence to grow more naturally and force more readily in the greenhouse. It seems to be also the time when one's less provident gardening friends drop in on their annual visit to take measurements and talk over building that long-delayed greenhouse, and it is a good time to talk over the matter from the amateur point of view. No two persons garden in the same way and with similar ideas, but no one can garden seriously for any considerable time in this climate without feeling the need of shelter of some kind for his plants, many of which are safe out-of-doors for only half the year. Even those of us who are specially devoted to the cultivation of hardy plants, find that as our collections grow we need shelter for plants whose hardiness is uncertain, or for those which are to be planted out, but have been received out of season. One can possibly garden successfully with cold frames in a hardy-plant garden, but they are anything but pleasant things to care for during the stormy days of winter. Besides, one's garden fever seldom reaches an ebb where flowers are not acceptable, and in the pursuit of these and of comfort we naturally gravitate toward a greenhouse or a desire for one. Unfortunately, it is too often a desire, for, curiously enough, there seems to be a general idea that a greenhouse is a luxury, expensive to build and expensive to maintain. This is one of those popular fallacies which keep afloat mostly because no one takes the trouble to deny them, and perhaps because the horticultural builders have not recognized the fact that there is a very large want of small greenhouses at a moderate price. Such greenhouses are offered abroad for much less than half the prices quoted here, and heaters in great variety at prices which evidently have some relation to the cost of production. It will be a great boon to horticulture when the builders wake up to modern business methods and offer out of stock a choice of a few styles of small greenhouses at a fair price, suitable for modest gardens. At present, however, one does not need to debar himself if he is willing to take some trouble. By visiting the owner of some small house one can get some measurements and sketch out his special requirements. The lumber for the double-board walls is of small expense at the nearest lumberyard. The sash-bars can be ordered of those dealers who make them a specialty, and the ventilating sash can be had of some dealers. Any carpenter can soon frame the structure ready for the glass, and, in fact, the whole thing is not beyond the skill of any one handy with tools. Seventy-five to a hundred dollars' worth of materials will suffice for a house large enough for most small gardens, and another fifty dollars should put in a water circulation, which is the best and most economical method of heating. It is difficult to advise on the form of the greenhouse most likely to prove satisfactory; it will depend very much on the species of plants grown. Of course, the cheapest form is a span-roof over wooden walls, as it is the easiest and quickest built. The modest structure which answers my requirements is an evolution from this form, and may be suggestive to any one who is likely to grow almost anything except strictly tropical plants, and who wishes also to store plants which must be kept cool and dormant. Originally I had a house about eight feet wide with side benches, with heater at one end and pipes under the benches. Outside of the house to the south was a row of cold frames. It was borne in on me after some experience that covering and uncovering cold frames was not a specially pleasing occupation, and I had rather too much heat in the house. I then raised the sash, sloping it from the ridge to the front of the cold frame, and by digging a walk just outside the former wall of the house, but now under glass, I have access to the beds of the former cold frame, and can work over them at any time in perfect comfort. This annex is ordinarily ten to fifteen degrees cooler than the main house. At the furthest end plants remain nearly dormant, and in other places there is warmth enough to bring plants and bulbs on gradually as may be desired. Later I took out the cube of earth under the south bench and removed the lower part of the former south wall, adapting it to a fernery. At present, with a house fifteen feet wide, I have now fifteen feet width of benches and solid beds and two paths. A further improvement would be to carry the north wall up three feet so as to make room for shelves which would hold more pots. But the most satisfactory addition ever made to the house was a coat of emerald-green, which painted it quite effectually out of the landscape. There does not seem to be any special reason why such a utilitarian structure as a greenhouse should be made specially prominent by the whitest of paint. Small greenhouses and commercial places cannot be made very effective show places, but it does seem

as if there might be a reform in private establishments conducted on a liberal scale, where usually the machinery of pipes, benches and pots is more prominent than the plants. It would seem that such places would vie with each other more in producing effective ensembles than in the production of crops.

Elizabeth, N. J.

J. N. Gerard.

Notes from the Botanic Garden of Smith College.

THE vigor and luxuriance of the Palms and other tropical plants in the Palm-house here seem to prove that the planting-out system is the best for making fine specimens in a short time, and we agree with Mr. Watson who, in a recent letter to GARDEN AND FOREST, says "that he would rather enjoy a healthy specimen for two years than put up with a miserable, half-starved scrag of a plant for twenty." The bed in the Palm-house here is forty feet long by twenty wide and five feet in depth; three feet below the path and two above. Underneath the bed is one and a half feet of broken bricks for drainage, and draining pipes pass through these. The soil is a sandy loam, being the top soil from the site where the green-houses now stand, with two cords of rotted stable-manure and five hundred pounds of ground bone incorporated. The bed is raised two feet above the path, so that it will be warmer than it would be if kept on a level. The sides of the bed are kept up by rock-work with a gentle slope in to the bed. The pockets in the rock-work are planted with some thirty-five species of Ferns and Selaginellas, several of a kind, a few varieties of Rex Begonias and Ficus repens. Considering the heavy spraying they have been subjected to while spraying the large plants in the bed, the following list of Ferns and Selaginellas have done exceptionally well: *Doodia aspera*, *Nephrodium hertipes*, *Asplenium biforme*, *A. bulbiferum*, *Nephrolepis exaltata*, *N. Phillipinense*, *N. cordifolia*, *Davallia Fijiensis*, var. *plumosa*, *D. Fijiensis*, var. *majus*, *Pteris palmata*, *P. serrulata*, *P. Sieboldi*, *Polypodium aureum*, *Aspidium falcatum*, *Lastrea opaca*, *Doryopteris nobilis*, *Gymnogramma sulphurea*, *Adiantum caudatum*, and in open places *Lomaria gibba* and *L. ciliata*, *Selaginellas Kraussiana* and *Martensi*, the latter being especially well suited for this purpose. Many of the other Ferns planted have done well, but are not as thoroughly suited for the purpose as those in the list given. In addition, many Ferns have sown themselves from spores probably blown in from the adjoining house, and some of the native *Selaginella Apus*, with Mosses and Liverworts, came up spontaneously. These, with the Rex Begonias and Ficus, have almost hidden the rocks from view, and make a beautiful and much admired edging for the bed.

We have in the house some twenty-eight species of Palms, representing, as far as we have been able to get them, types of the different sections of this family, though not more than eight are planted in the permanent bed. Besides these eight Palms the bed contains three Tree Ferns of different species, namely, *Alsophila australis*, *A. excelsa* and *Dicksonia antarctica*; one *Ficus religiosus* and *F. elastica*, a large specimen *Codiaeum*, var. *Queen Victoria*, *Coffea Arabica*, *Ravenala Madagascariensis* or Traveler's Tree, *Bambusa arundinacea*, *Dracaena fragrans*, *D. australis*, a fine specimen of *Cyanophyllum magnificum* with leaves thirty-two inches long and seventeen wide, a clump of *Hedychium Gardnerianum*, and one *Monstera deliciosa*. For undergrowth we have planted, nearer the outer edge, clumps of *Calathea zebrina*, three species of *Philodendrons*, some of the large-leaved Begonias, such as *B. riciniifolia*, *B. Verschaffelti*, *Curculigo recurvata*, clumps of *Aspidistra lurida* and *Peperomia arifolia*, which make fine plants planted out, also several varieties of *Codiaeums*, while in the centre among the Palms are some of the commoner species of Ferns and plants of *Sanchezia nobilis*, which do remarkably well used in this way. Three species of *Musa* have been planted so as to give the house at once a tropical effect. These will be removed as soon as the Palms attain a large size. *Musa Chinensis* is just now in fruit, the cluster containing about one hundred well-developed bananas, not quite ripe. This bed was planted toward the end of April last year, and I feel perfectly safe in saying that almost every plant has more than doubled its size.

On the side-tables, in addition to the young Palms already mentioned, are a small collection of Bromeliads and collections of ornamental-leaved tropical plants, flowering tropical plants, economic plants and plants of purely scientific interest. In baskets suspended from the roof are several species of *Nepenthes*.

The modern iron-framed greenhouses are excellent, but they have some disadvantages. Since the space under the

side-tables is all taken up by the hot-water pipes we have no opportunity for planting climbers, which add so much to the beauty of a house. Every experienced gardener knows how much better his ornamental climbing plants will grow when they can be planted out under the side-tables than when confined in pots or tubs. To overcome this difficulty we have planted them in boxes six feet long by two wide and one foot deep. These are painted an inconspicuous color and stand on the side-tables. The vines were planted last July and all have made good growth and some have flowered profusely. We have *Allamanda grandiflora*, *Bougainvillea glabra*, *Clerodendron Thompsonæ*, *Aristolochia elegans*, *A. Duchardii*, *Bignonia speciosa*, *B. Chamberlaini*, *Thunbergia Harrisii* and *Passiflora Pfordti*, with space left for rarer species when they can be secured. All the vines are trained on horizontal wires placed about sixteen inches from the glass, to avoid any possibility of freezing.

Botanic Garden, Northampton, Mass.

Edward J. Canning.

Water-lilies.

How to Winter Them.—Keeping Water-lilies through the winter is considered by many more difficult than growing them and producing first-rate flowers, but, as with many other plants, the more experience one has with the different varieties and their peculiarities the more simple their cultivation becomes. Of tropical or tender *Nymphæas*, medium to small tubers are the best to carry over winter, but it sometimes happens that it is desirable to retain a certain plant or variety that has made extra-large growth during the summer. I had several such last season, and by way of experiment I tried a new method of wintering. After the frost had cut off the foliage I awaited a mild spell, and then with a spade dug around the plant; I gave it a root-pruning, taking care to keep outside of the tubers, so as not to cut them; then with a spade on either side lifted the stool intact. This was again planted in the soil, which is sandy, under the bench in the greenhouse, and thoroughly soaked to settle the soil. After a few days the roots were much decayed, and another soaking of water was given to settle the soil around the old crown and attached tubers. In this condition they were left, and on examination at this date, February 2d, the tubers were in excellent condition and will remain so for a long time. Even the hardy varieties treated in this way are keeping better than I had expected. This treatment is not so well adapted to large plants of the *Stellata* type, as they do not form side-shoots and tubers. The best method for carrying these over winter is to keep them growing. These, though very large, were severely root-pruned, the largest leaves taken off, and potted into as small a pot as would hold them, which was ten inches. The plants have kept growing slowly, and are now fine and healthy with flower-buds. The water has been at a temperature of from sixty to sixty-five degrees, which is the temperature of the house.

Winter-flowering Aquatics.—Such varieties as *Nymphæa stellata*, *N. Zanzibarensis* and *N. pulcherrima* have been in bloom all winter. The latter variety is the best of any of the blue forms. The flowers open quite early in the morning, and remain open until late in the afternoon, whereas those of *N. Zanzibarensis* seldom, if ever, open until noon or shortly before. Little can be expected in the line of Water-lily flowers during December and January, but *N. delicatissima* and a seedling much like *N. Smithiana* have not failed to produce flowers of good size and substance. *N. O'Marana* has proved a disappointment. It was hardly recognizable as the plant which I saw in such good form, condition and color out-of-doors last summer. *N. Devoniensis* and *N. rubra* are better.

Aponogeton distachyon proves a first-rate winter-flowering plant. It enjoys a temperature of fifty to sixty degrees, and blooms freely all through the dull, sunless days. The flowers are sweet-scented, resembling hawthorn, and are good for cutting.

Seed Sowing.—We have decided to raise some Water-lilies from seed, and as it takes between three and four months to grow a flowering plant from the seed, the sowing must be done at once, of both hardy and tender varieties. Four or five inch pots should be used for the purpose and sandy loam. If the latter has lain some time and had manure composted with it so much the better, and fresh manure should not be used. The seed should be covered lightly after it is sown and the pots stood in water until the seed is thoroughly soaked. The pots should be submerged so that the tops are two inches below the water. Attention to this particular is necessary, or the seed will not germinate. The temperature of the water should be from seventy-five to eighty degrees. *Victoria regia*

seed may be sown now, but the temperature of the water must be eighty-five to ninety degrees, and from twenty to thirty days is required for germination. The young seedlings should be transplanted at an early stage and kept steadily growing. They must be repotted singly before they are weakened by overcrowding and by starving conditions.

Riverton, N. J.

W. Tricker.

Cypripedium Morrisianum.—This is a distinct and pretty hybrid, the result of a cross between *Cypripedium Harrisonianum* and *C. Leeannum giganteum*, one of the finest and largest flowered forms of *C. Leeannum* in cultivation. The bloom is brilliantly colored, of excellent shape and substance, the dorsal sepal measuring over two and a half inches across, quite flat, with a broad white margin, faintly suffused with rose, the base of which is deep bronzy purple, having numerous lines of a lighter shade emanating from the base, which are profusely marked with minute purple spots. The inferior sepal is a clear pea-green, with several lines of a deeper tone; the petals are broad, measuring three-quarters of an inch in width, the edges closely set with numerous hairs, becoming very dense at the base, the whole a rich sherry-brown. The pouch closely resembles that of *C. Harrisonianum*, and is of a rich deep purplish brown. The plant partakes of the character of both parents, having charming tessellated foliage. It has been named in honor of Mr. J. Morris, who has charge of the valuable collection of *Cypripediums* owned by Hicks Arnold, Esq., of this city. It flowered for the first time in F. Sander & Co.'s nursery, St. Albans, England.

New York.

A. Dimmock.

Correspondence.

Some Rare New Jersey Plants.

To the Editor of GARDEN AND FOREST :

Sir,—*Lygodium palmatum*, the lovely and somewhat rare climbing Fern, was known to grow in quite a number of localities in this state at one time. Many of these Ferns are now destroyed. In the fall of 1894 I rediscovered the plant near Haddonfield, Camden County. It was growing abundantly among the Alders and Cornels that fringe a small brook, climbing to a height of four feet. It is very graceful and delicate in appearance, but the abundant growth indicated that it was perfectly at home.

Arenaria lateriflora is found quite abundantly on the sand-hills below Atlantic City. Some of the dunes have a complete carpet of green formed of its trailing stems and foliage. The fact of its being evergreen was unknown to me until this winter, when, having occasion to use some of the plants, I visited the locality (about one mile below Chelsea). I was at once struck by its beauty and adaptability for planting under trees in exposed sandy seaside places. It blooms quite freely in spring, the small white flowers resembling some of the *Stellarias*.

A rare and very peculiar plant is *Clitoria Mariana*. It appears in isolated places many miles apart, sometimes diligent search failing to reveal more than a single plant. I have always found it on quite dry sandy land.

Desmodium rotundifolium is a very ornamental trailer as it grows here. The habit of the plant is entirely prostrate, the large, perfectly round green leaflets covering the ground completely. It seems to thrive under trees where the shade is very dense, and I have often found it in full exposure. A single plant often covers a space two feet across.

Hammononton, N. J.

F. L. Bassett.

More About Choke Cherries.

To the Editor of GARDEN AND FOREST :

Sir,—I was very much interested in the letter of Professor Card which appeared in your issue of February 3d, on "The Choke Cherry in Cultivation." I send you this note to corroborate the statement of Professor Card, and to say that in the clay flats of the Province of Quebec, bordering the Richlieu and St. Lawrence rivers, the Choke Cherry is one of the principal fruits cultivated by the French habitant. This is owing largely to the character of the soil, which is of the pronounced blue-clay stamp and of the stickiest and most impervious type. In this region the Choke Cherry may be found in almost every French garden. It is cultivated mostly in tree form, and multiplied by means of the suckers which spring up about the roots. A great many variations occur. Fruit large and small, light and dark, astringent and non-astringent, may be found. Two years ago I found a tree bearing large clusters of yellow-

ish white cherries. I have sown the seed of these and am watching the young seedlings with interest, hoping that improved forms may appear. The French use this fruit in many ways, but it is most largely partaken of uncooked, next as preserves, while a smaller proportion is made into jelly. The tree is hardier than the Wild Black Cherry, *Prunus serotina*, and is found all through the north-west territories, even upon elevated portions of the foot-hills of the eastern Rockies.

Central Experimental Farm, Ottawa, Can.

John Craig.

Meetings of Societies.

Western New York Horticultural Society.—II.

WE conclude our report of this meeting of fruit farmers by giving the principal points in two other addresses :

THINNING APPLES.

This was the theme of Professor S. A. Beach, and a timely one, since the overwhelming crop of the past year has seemed to some growers as much of a calamity as the attacks of fungous diseases or the ravages of insects. Since prices for the crop did not cover the cost of packages and the labor of picking and handling the fruit, Professor Beach argued that it would have been good economy to have thinned the crop so vigorously as to reduce the total yield and increase the amount of fruit of the first quality. This is not merely a theoretical view, since some tests conducted by the Geneva Experiment Station, in Ontario County, indicate that, besides relieving the market of inferior fruit, thinning has a marked influence on the productiveness of the trees in succeeding years. In these tests trees of the same variety as nearly alike in all respects as possible were paired for comparison, the fruit on one being thinned and the other left untouched. The thinning was tried in three ways: (1) all wormy, knotty and inferior fruit was removed and all clusters reduced to one apple; (2) in addition to this fruit-culling the remaining fruit was once more picked over, so that the apples left were not less than four inches apart; (3) same as the first treatment, with the remaining fruit thinned to leave apples not less than six inches apart. Trees of Baldwin Apples treated by the first method gave sixteen per cent. less fruit of all grades, and ten per cent. more fruit of the first grade, than the corresponding trees not thinned. Under the third method Hubbardston trees gave twenty-five per cent. less fruit, but seventeen per cent. more first-grade fruit. Greenings, which were heavily loaded in 1895, bore a good-crop in 1896, but were not overburdened, and needed comparatively little thinning. Under the second method they gave six per cent. more fruit and ten per cent. more first-class fruit than unthinned trees. In all these tests about one bushel of culls was found on the trees, which were thinned to three bushels where the fruit was not thinned; while in all grades the thinned fruit was clearly superior in size and color to fruit of the same grade not thinned. The first grade included no apple less than two and a half inches in diameter, and the proportion of the apples which measured above two and a half inches was much larger where the fruit was thinned than where it was not, so that No. 2 apples from trees that were thinned were superior to the same grade from the trees not thinned. It was estimated that the fruit from the trees picked over would bring from ten to fifteen per cent. more in market than the same grade from trees which had not been picked over. Taking these results, the second method of thinning was enough superior to the first to more than pay for the extra work involved. Accurate data for comparing the second and third methods are not at hand.

It is too early to report precisely the effect of this treatment on next season's crop, but the experiment shows a marked improvement in the size and color of the fruit where the overloaded trees were severely thinned. These results are not surprising, and the experiments were hardly necessary to demonstrate them. The questions which remain to be determined are (1) whether it is possible to so control the productive energies of Apple-trees that they will usually bear every year rather than every alternate year, or even less frequently; and (2) if so, whether the results will warrant the expense of the extra work involved. It is well known that the thinning of peaches and pears makes a marked difference in the size, color and quality of the remaining fruit, and there is no doubt that apples on an overloaded tree cannot mature so great an amount of large, well-colored fruit as one which bears a moderate crop under the same conditions. The production of a great proportion of very large fruit seems to depend on the ability of the tree to furnish nourishment to the individual branches or fruit spurs.

The tree may be looked upon as a machine for manufacturing plant substances out of crude materials obtained from the soil and air. The work is done in the green portions of the plant, almost wholly in the leaves. In the presence of warmth and sunlight the crude material enters with the sap through the root, rises to the leaves, and with other material taken from the air it is built up into starch, sugars and other compounds which go to sustain the life and the growth of the plant. The total amount of such product which a tree can manufacture in a season is largely determined (1) by the amount of available plant-food in the soil, (2) the amount of foliage which continues healthy and vigorous throughout the season, (3) the total amount of sunlight and temperature favorable for the growth experienced during the season, (4) by a certain factor which may be called individual capacity and vigor of the tree. The amount of food material which a tree can supply in a given season for growing a crop of fruit is therefore largely fixed by the conditions last named and the amount of reserve material which was stored up in the tree the previous season for future use. After an Apple-tree has reached maturity the forming of fruit-buds during the latter part of each season is a perfectly normal process which will take place whenever the tree has sufficient nourishing material to supply this demand in addition to sustaining its growth, ripening its wood and providing leaf-buds for the coming season. The fruit grower may provide to some extent for the formation of fruit-buds each season by directing to that end the favoring influences so far as they are under his control. The foliage may be protected from attacks of disease and insects by spraying, so that it can elaborate the food material essential to developing the various plant tissues. By tillage and fertilizers enough plant-food in readily available form can be provided in the soil. By judicious pruning the amount of bearing wood may be regulated so as to reduce the labor of thinning the fruit, and sufficient light may be admitted to the inner and lower branches to help the leaves in manufacturing substances essential to the growth of fruit. Finally, by thinning the fruit so as to prevent the prodigal waste of the resources of the tree in seasons naturally favorable to excessive yield, the trees may be brought into more regular bearing, and in the end a much larger amount of first-class fruit can be produced. It may be objected that it is impracticable to thin apples because the fruit does not ordinarily bring a sufficiently high price to cover the cost of extra labor, and this is perhaps the most serious objection to the practice which presents itself to practical growers. Questions as to the best way of doing the work must be settled by practice in accordance with local conditions. Mr. Charles A. Green has written to *The Rural New-Yorker* that he took off from one-third to one-half of the fruit on a tree in a short time with an ordinary steel garden rake. Mr. T. Greiner has suggested in the same paper the shaking off of fruit and whipping it off with long poles. Both men admit that these methods are crude, and, no doubt, they suggest them simply because they are inexpensive. They are objectionable because no discrimination can be used as to the kind of fruit which is removed. Besides this, they cannot be used in June when the largest apples are no more than an inch and a half in diameter and the trees must, therefore, carry their full burden till later in the season before the fruit is large enough to be raked, clubbed or shaken off. The energies of the tree are thus wasted, and the fruit which is left cannot be expected to show as great an improvement as when thinning is done earlier in the season. More careful methods must eventually be adopted before thinning becomes an established practice.

It is well known that the lower branches and shaded parts of the tree bear a larger proportion of fruit inferior in color, size and quality than the branches which have more light. Most of these lower branches may usually be reached from step-ladders or racks fastened on wagons so that the parts of the tree which most need to be thinned can be reached with comparative ease. It would seem that by some such method a large part of the thinning could be satisfactorily done with cheap labor under experienced supervision. It should be remembered that the increased value of a crop is not the only item to be credited to the practice of thinning. It costs considerable labor to prop the branches of trees and save them from breaking under excessive burdens, and this goes to counterbalance the expense of thinning. Besides this, in an unthinned crop a large amount of inferior apples must be handled at little or no profit, or possibly at a loss. The ripening of this inferior fruit practically shuts out the possibility of a crop the next year. Looking over the season of 1896 we see broken trees and broken prices. Looking forward to the season of 1897 we see barren trees, with prospects of good prices. And after all the labor the late great crop has imposed, and

the loss it has brought to many fruit growers, is it not worth inquiring whether the thinning of the fruit in 1896 would not have paid? Would it not have been better if half the second-class apples grown in New York had never been marketed? If throughout the apple-growing sections half the seconds and all the culls had been thinned out early in the season, the remaining crop would have been exceptionally fine, and New York would have sustained the reputation for fine apples, which would be a material help in marketing succeeding crops. Besides this, having exceptionally healthy foliage and a favorable growing season, it is reasonable to expect that the partially unburdened trees would have provided fruit-buds for at least a fair crop next year.

PLANT-FOOD IN SOIL.

Professor Roberts read a paper entitled "An Inventory of the Land," which was a study of the productive power of soil. From a number of analyses he found that, on an average, eight inches of surface soil contained of potential plant-food to the acre 3,053 pounds of nitrogen, 4,219 pounds of phosphoric acid, 16,317 pounds of potash. This means so large an amount of the necessary elements of plant-food that one wonders why we do not secure larger crops and why we need to manure the land. Of course, with our present methods of tillage a very large percentage of this plant-food is not available, and the problem is how to treat this dormant food so that it can be used by the growing plants. The first consideration which impresses Professor Roberts is that it is not lack of food in the soil so much as lack of moisture which causes plants to languish. The prime object of successful tillage then ought to be to make the land a reservoir for the storage of moisture and to so treat it by stirring the surface as to prevent its evaporation, or, in other words, to compel it to pass off through the plants and do its work in supplying them with food. A number of experiments made during 1895 and 1896 on land of light and gravelly texture in cultivation without the use of any fertilizers seem to prove that large crops of potatoes, say 350 bushels to the acre, could be grown by cultivating between the rows so frequently as to pulverize the soil and liberate the plant-food. Of course, if there had been more rain there would have been better crops, but the tests seem to show that the soil could be so worked as to release as much plant-food as the crop could digest. At all events, it is Professor Roberts' belief that there is enough inert plant-food in the soil which can be made available by a little extra expense in tillage and cultivation, and that by the same method in ordinary seasons enough water can be preserved in the soil to develop a paying crop.

Notes.

During the first week of this month 47,000 bunches of bananas were received at this port.

During the fiscal year ending June 30th, 1896, 376 publications were issued by the United States Department of Agriculture. Exclusive of reprints these publications comprise 10,170 pages, and the total number of copies of all of them was 6,561,700.

At the more elaborate dinners and balls given by wealthy society people this winter the chief decorations have been of costly Orchids interspersed among the fronds of *Adiantum Farleyense*. *The Florists' Exchange* tells of one dinner table laid for thirty-two covers which was decorated with five hundred flowers of *Cattleya*, 2,200 of *Dendrobium* and 200 spikes of *Lælia anceps*, laid in a foundation of *Adiantum Farleyense*.

The new white Rose, *Lillian Nordica*, for which Mr. M. H. Walsh, of Woods Holl, Massachusetts, received a certificate of merit from the Massachusetts Horticultural Society last year, was exhibited at a recent Saturday meeting of the same society in Boston and attracted great attention. The flowers have long, straight stems, rich dark green foliage and exquisite fragrance. The seedling blooms freely and is from Margaret Dickson crossed by Madame Hoste.

As we stated last December, Albemarle Pippins have been uncommonly scarce this season, the entire crop in Virginia amounting to but 1,000 barrels. Most of the single car-load of this fruit which came to this city was exported, but the English supplies of this favorite apple have been mainly of the similar Newtown Pippins, from the Hudson River district in New York state. Five car-loads of Newtown Pippins recently reached this city from Oregon and California, and these, carefully repacked in boxes holding a bushel, have been shipped to London, where they have been pronounced the best apples of the kind seen there this season. They have realized as much as \$5.50

a bushel, a remarkable price in any season, and especially so when nearly two and a half million barrels of apples have been exported to Great Britain from the United States and Canada since last August, and with the best Baldwin and other standard varieties selling in England now for \$2.50 to \$4.62 a barrel.

At the recent conference on the occasion of the tercentenary of the introduction of the potato Professor Johnson spoke of the value as a substitute for the potato of *Stachys tuberosa*, a vegetable which is growing in favor in England, France and Switzerland. Somehow American gardeners do not seem to take much interest in its cultivation, although it contains eight times as much nitrogen as a potato of the same weight and a large quantity of a carbo-hydrate called galactan, which is more digestible than starch, being allied to dextrin, and therefore more easily converted by the digestive juices into sugar. For this reason the tubers of this plant would be especially useful for invalids and persons of delicate digestion, since they bear the same relation to the substance of the potato that peptonized foods do to ordinary meats.

Tests made in California as to the shrinkage of different varieties of prunes show that the small French prunes, thirty of which weigh a pound when fresh require seventy-five to the pound when cured, in round numbers, or, more accurately, the weight of the fresh prunes is to the weight of the prunes when cured as 253 to 100. In the large French prunes the ratio between the fresh fruit and cured fruit is as 291 to 100. Of the Robe de Sargeant variety the ratio was 278 to 100, while the ratio of the so-called Imperial prune of France was practically the same as that of the small-sized French prune, namely, 253 to 100. This Imperial prune is a trade name of a very fine French product, and the only variety which comes up to the standard is Imperiale Epineuse. This variety has but recently been introduced into California orchards, where it has proved of the very first quality. The leaves of the tree endure dry weather well, but it has not been planted long enough to demonstrate that it will be productive.

Some experiments recently made at the Massachusetts Agricultural College by Mr. Asa S. Kinney seem to show that a current of electricity will accelerate the germination of seeds. In a collection of seeds treated for twenty-four hours, thirty per cent. more germinated under the current than in lots untreated, and the seeds which received the electrical stimulus gave a higher percentage of germination than others. In many cases electricity seems to act a good deal like light does in its stimulating effect. It must be understood, however, that even if we admit this we do not know the best methods of using electricity upon plants in the soil, nor what strength of the current will probably secure the greatest growth. The range and the strength of the current which accelerates germination is found to be exceedingly limited. So far as these experiments go to form a basis of judgment, it would appear that the strength of the current which shows the greatest growth of radicles is equal to about three volts, where an interrupted induced current is used.

In the past two or three years not a few figs carried over by wholesale dealers until August, when they have become dry and unsalable, are then dipped into a thin syrup to freshen them. They are packed in fancy splint baskets holding a pound or more, enclosed with a muslin cover sewed on the edges, and alluringly stamped "Turkey." If sold at once before the arrival of the new crop and while yet in good condition, they are satisfactory to the uninitiated housekeeper, and are really rather improved by the harmless process. They are mostly sold by grocers and at second-class fruit-stands, and cost twenty-five cents a package. Kept too long they become moldy and musty. Recently a similar process seems to have been applied to a limited quantity of presumably new-crop figs, the fruit being then readily drawn out into its natural form, and labeled "pulled figs." These have been sold at the exorbitant price of fifty cents for a neatly packed box holding less than a dozen and a half of the fruits. In this case there is no good reason for the freshening, since the new-crop fruit still retains its own juices, and the effect is to make it bitter and not at all the delicacy it affects to be.

A Chicago florist has been selling fine Freesias with straight, stiff stems from eighteen to twenty inches long, and large, erect flowers, at \$3.00 a dozen, while the common run in the market are hard to dispose of at \$2.00, and sometimes at \$1.00. These Freesias come from the stock of ten years ago, when the flowers first began to attract attention, and the

bulbs are better than when they were first obtained. Ten or twelve are planted in a seven-inch pot, and after the flowering period is over the foliage is allowed to die off naturally, and then the plants are treated like Callas, being allowed to die down every year. When there is no longer any growth the pots are set under greenhouse stages and kept perfectly dry. About the first of August the bulbs are sifted from the earth and selected into sizes, and those of the same size only are placed in the same pot. For years they have come into flower about Christmas or New Year's, and by being placed in heat in succession they bloom until the end of February or the middle of March. Certainly this care is well repaid, and, cheap as Freesia-bulbs are, the purchase price is saved, and the bulbs are always on hand for early planting, which, after all, appears to be important for their successful growth.

Oranges from Cuba now sell at \$6.00 a barrel, wholesale, repacked. While very sweet, this fruit is not at all showy or attractive, the skin being coarse and dull-looking. The Havana fruit also has poor keeping qualities and must be sold soon after landing and used within a fortnight. The season for Jamaica oranges is almost ended, but 250 barrels having been received here during last week. Altogether, 254,080 barrels and 23,340 boxes of this fruit have come here since the first importations last September. But these heavy shipments have been carried on with very little profit to steamship lines and importers, and in some instances at considerable loss. Of 35,000 barrels of oranges which came from Jamaica in one week early in the season, all of the fruit was unripe and half of it spoiled from being gathered during rains and from careless packing. This want of care and judgment in picking, packing and shipping is said to be the cause of an unprofitable season when the outlook was highly favorable, owing to the scarcity of Florida oranges. The season for the latter is also closing; the best now sell for \$5.00 a box, at wholesale. Washington Navel oranges, from California, are the showiest of all citrus fruits now seen here, and are especially bright and clean; \$3.50 a box, at wholesale, is a fair price for this choice fruit, which is juicy and sweet. Of Mediterranean oranges, good Valencias sell for \$2.65 and Sorrentos for \$2.15, prices on Mediterranean oranges and lemons having advanced fifteen to twenty-five cents a box during last week. There are now 20,050 boxes of these oranges and 147,000 boxes of lemons on the way to this port. Grape fruit from Jamaica costs \$6.00 to \$10.00, and from Florida \$12.00 a box, at wholesale.

Dandelion is now coming from the meadows of New Jersey and from under glass, the forced plants being more luxuriant in growth, though not more tender. Both sell for fifteen cents a quart. Other offerings in collections of fresh vegetables are spring onions and leeks, chives in little clumps of soil, endive, chervil, fennel, watercress, mint, escarole, tarragon, parsley and sorrel. Well-grown shoots of rhubarb cost ten cents for a bunch of seven; Boston cucumbers, twenty-five cents each. Okra, from Cuba, costs ten cents a dozen, and peppers five cents apiece. Short plants of celery, from Rochester, New York, sell for seventy-five cents a dozen, and the longer ones, from California, beautifully blanched, for \$1.00, while the new crop from Florida commands \$1.50. The best cauliflower now comes from Florida, large perfectly white heads costing thirty-five cents each; those from California are yellowish after the long journey, and find slight demand. Large quantities of spinach and kale have been coming from Norfolk, Virginia, one steamer last Saturday bringing 1,400 barrels of spinach and 600 of kale, and the receipts of these two vegetables for the week amounted to 11,050 barrels. These sell at twenty cents a half-peck. Florida tomatoes cost twenty cents a pound, and those from northern hot-houses forty cents. String-beans are quite plentiful at twenty cents a quart, while southern peas are scarce, and some from California have sold at \$1.50 a half-peck. Bright, fresh eggplants cost twenty cents each, and new beets and kohlrabi, four in a bunch, ten cents, and among winter roots oyster plant and knob-celery may be had for the same price. Winter beets, carrots, turnips and parsnips are in regular supply. Cabbage, from Long Island, costs ten cents a head, and the red sort brings fifteen cents. There is also Danish cabbage in market, and new cabbage from Florida. Lettuce is coming from Boston hot-houses and from Florida and Cuba, and Romaine lettuce from Bermuda. Onions, from Bermuda and Havana, bring thirteen cents a quart. Bermuda potatoes sell for fifty cents, and sweet potatoes, from southern New Jersey, for twenty-five cents a half-peck. Mushrooms continue abundant, the best costing but fifty cents a pound. Hot-house asparagus is still a luxury, and commands ninety cents for a small bunch.

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Tree Pruning.

TREES can still be pruned to advantage up to the time, now rapidly approaching, when the limbs are gorged with sap, so that they will bleed more plentifully than at other seasons. This loss of fluids does not operate to weaken the vitality of a tree to any serious extent, but as the sap runs down the bark and keeps it wet for a long time, besides preventing the adhesion of any coating over the raw surface, the spores of various rot fungi are apt to find a lodgment in the wound so that decay will set in. This loss of sap will make comparatively little difference in the case of small limbs, and it should not prevent the prompt removal of stem and root sprouts, for example, so that these will not continue to exhaust the energies of the tree another season. As a rule, late autumn is the best season for the general pruning of ornamental trees, because the leaves are then out of the way and the branches which cross and rub against each other can be detected. When the whole skeleton is made bare it is more easy to see which branch it is that projects in such a way as to make an unsymmetrical head and where the limbs are growing too thickly.

Of course, no one should be allowed to use a knife or a saw on a tree unless he knows exactly what he wants to accomplish by pruning and can tell why the operation will bring about the desired end. Some tree lovers are so sentimental that they look upon any pruning whatever as a species of cruelty. Others believe that every effort to make a tree shapely is unnatural, and therefore inartistic. But it can be easily demonstrated to the first class that, instead of inflicting an injury, the good pruner can add to the vigor and longevity of a tree, especially of one which for any reason has begun to show signs of feebleness. To the other class it may be said that the effort to keep the tree shapely and in its proper natural balance by pruning is quite a different operation from clipping it into a form unlike what it ever would assume if naturally grown. It is small wonder that persons who watch a gang of professional tree-trimmers moving their equipment of ladders and axes from one tree to another along a city street

shudder at the butchery they witness. These impostors often saw off every large limb a few feet from the trunk and leave only an occasional stub projecting from the remnants of these limbs, so that what was once a tree becomes a mutilated stump, and the very process which was intended to make it healthy and beautiful ruins it beyond any hope of recovery. Of course, street trees need pruning, but if they have been well selected at the outset a small knife will suffice to remove while they are young an occasional branch which starts from the wrong place, and if they are carefully attended to for some years rarely will any large branches need to be removed. While on the subject of shaping trees it may be remarked that on a broad lawn single trees never look as well as when their branches sweep the turf, and in most instances it is a barbarity to cut these away. Coniferous trees which grow in a pyramidal form, unless they are closely crowded in a wood, always branch close to the ground, and the removal of these lower limbs not only converts a beautiful tree into an unsightly object, but it almost certainly injures the health of such species as naturally grow in moist climates, for these low branches not only check evaporation from the soil and retain moisture about the roots of the tree, but they help to bring the centre of gravity of the mass nearer the base, and in this way enable the tree to better withstand the force of the wind.

We began this article, however, for the special purpose of calling attention to the fact that pruning can be used as a remedial or restoring process upon deciduous trees which have become decrepit. There is nothing new in this, and in the very first volume of this journal, and often since then, we have explained how trees which have begun to show signs of enfeebling age can have their youthful vigor renewed. When the upper branches of a tree begin to die, this means that for some cause the tree is receiving insufficient nourishment. When the ground has been pastured over and trampled upon, the food taken away by grass or crops and the tree neglected in every way, there is nothing that will so stimulate new life as vigorous surgery. More is needed than the cutting away of branches already dead. A tree on the decline should have its main branches all shortened in from one-third to one-half their length. What is needed is more leaf-surface, because the vital work of the tree is carried on in the leaves, where the plant food taken up by the roots and from the air is elaborated and transformed into growing tissue. These feeble branches carry nothing but small and scattered leaves which do not suffice to carry on the life-work of the tree with energy. But when a branch is cut away the tree at once exerts itself to throw out new shoots, and these shoots will bear much larger leaves, so that the leaf-surface of the tree will be greatly enlarged, while the amount of wood to be vitalized is decreased. Of course, such trees can be helped in other ways—that is, by covering the ground with ashes or well-rotted manure, or by giving in any other way a supply of food that is easily assimilated, but the pruning is the energizing factor in the process. Every one has noticed how vigorously a shoot will start from the root of a young Oak which is cut to the ground, and how the leaves will expand to accommodate themselves to the greater work imposed upon them, and prepare to utilize all the sap the roots will furnish. It is this same principle which will stimulate an old tree when its branches are pruned hard back to throw out new shoots and clothe them with abundant foliage.

We almost hesitate about repeating such an elementary injunction as that a branch should be cut off close beyond a healthy lateral, and yet it is a rule that we see violated every day, not only in ornamental plantations, but even in orchards. This lateral branch in spring will throw out a great number of leaves which supply themselves with sap which they can digest and send back to the very extremity of the amputated limb. If this extremity is painted over with coal-tar, or any other thick paint laid on with a brush, the wound will begin to heal over at once. On the con-

trary, if the amputated stump is left, so that the sap does not circulate to its extremity, it will necessarily die back to the point where the sap ceases to flow. This simple fact was illustrated in the first volume of this journal on page 349, with cuts taken from "A Treatise on Pruning Forest and Ornamental Trees," translated from the French of Monsieur A. des Car, and published in 1881 by the Massachusetts Society for Promoting Agriculture. A little reflection will show any one that as the living trunk or branch grows and envelops what is merely a dead plug, the tree will inevitably decay to the centre, for, as the rot fungus destroys the lifeless wood, water will soak in and carry these elements of decay deeper and deeper until the tree is hollowed out and finally made worthless.

All our native forest-trees take kindly to this treatment, and it was nine years ago when we wrote that most of them could be rejuvenated in this way. We then explained that decrepit Red, Black, White and Swamp Oaks, Black Birches, Beeches, Hickories and Elms had been thus pruned in the Arnold Arboretum where the trees in the natural woods were perishing from pasturage and from neglect. They were covered with dead branches, the foliage upon them was thin and poor, their dying tops showed that they had but a short space to live. It seemed important to save many of these old trees until a growth of self-sown seedlings could be brought on to replace them and a covering grown for the forest floor, and as some of these old trees were pruned each year those which had been operated upon first, or some six or seven years earlier, already showed in their dense dark-colored leaves and compact growth that pruning alone without any fresh soil or fertilizing material could put new life into a tree that was feeble and dying. Subsequent experience has confirmed the usefulness of this practice, and we can repeat our counsel with confidence, and advise all persons who have deciduous trees which have begun to fail to undertake the renewal of their vigor by intelligent surgery.

The Chemise World.

OF all Californian shrubs or trees, the Chemise brush or Chemisal, *Adenostoma fascicularis*, gives most character to the landscapes of the Coast Ranges. What the Heath is to western Europe, Chemisal is to California, and vast tracts of poor mountain lands are covered with thickets composed almost entirely of this one shrub.

Outside of the timber belt, which begins at Monterey and extends at intervals to Oregon, there is scarcely a mountain on the Coast Range of California, from San Diego on the south to Trinity, almost at the Oregon line, which is not in part covered by it. The greater the distance from the ocean the larger the percentage of mountain lands which this hardy shrub has taken possession of, until many sections of the eastern part of the Coast Ranges are almost entirely given up to it, and from the valleys to the mountain tops it holds a sway only shared by a few of the hardiest shrubs, Oaks and conifers. Many millions of acres of Government lands, which look so inviting on the maps, are but Chemise patches, and, as now, will always be a man's land, harboring only the deer and the coyote. Hardly a spot is too steep to allow it a foothold, hardly a soil too meager to afford it sustenance. Fires sweep over and leave blackened stubs, but with its unusual vitality it soon starts a new growth. In a few years rocks, hills and slopes are again masked by a close cover of blue-green which gives to the mountains a softness of outline peculiar to the Coast Ranges, and very beautiful, too, although the monotony of flowing lines often becomes tiresome.

Ukiah Valley is hemmed on the eastern side by a long, even-topped range of mountains. On the map they bear the Indian name of Mayacamas, being one of the numberless short ranges which form the jumble known as the Coast Range. The Mayacamas divide the chain of valleys, once lakes, of which Ukiah valley is one, from another

chain of lakes which are now slowly undergoing the same process of extinction. The largest of these is Clear Lake, a beautiful body of water, mountain-hemmed, thirty-five miles long, with a maximum width of eight miles. Next to Ukiah valley the range rises first in rolling foothills, which give way to steep grassy slopes interspersed with Oak woods, or occasional Chemise-covered barren mounds. Above the Oaks the upper range is to be seen as an endless succession of round-topped knolls or smooth slopes, all Chemise-covered, with the sky-line seldom broken by fringe of distant rock or tree mass.

If a more intimate knowledge of the high Chemise world is desired, access is not difficult. Many trails or wood roads lead through the Oak woods and the open ranges, and traveling is not difficult on foot or on horseback. Half-way up the mountains the Chemise is entered, and the hills which from the valley seemed covered with a smooth low coat are found to be tangles of dense brush from four to eight feet high, except where a fire has recently burned. Travel in the Chemise is of necessity pretty closely confined to the trails which have been made along the ridges by deer, Indians or hunters, and even on these trails it is not always easy. But let the hunter stray from the trail and he is apt soon to find himself in a thicket so impenetrable that he can neither force his way through nor crawl under, and it does not take a long experience in attempting to pull himself over the tops to convince him that the trail is the only satisfactory place for travel.

So year after year the Chemise grows, and by the not infrequent winter snows is pressed down more compactly, until some day a hunter, wishing to drive out the game or make for himself an easier passage, drops a match in the tinder underneath, and a fire is started which rolls over the hills in sheets of flames, making the grandest of pyrotechnical displays for the valley dwellers. Creeping among the dead leaves in thinner brush, it burns swatches for miles and finally dies out only when fuel is exhausted, it may be in days or weeks. Where the brush has been thick and the wind favorable only short stubs are left, but as often as not the leaves and twigs are burned and the stout stems remain a *chevaux-de-frise* almost as hard to penetrate as the original thicket, and even more destructive of good temper and clothes.

A favorite trail into the great expanse of Chemise between here and Clear Lake leads along the main ridge which divides the waters flowing into Russian River from those which, flowing at first into Clear Lake, finally find their way into the Sacramento River. This route, closely hemmed for miles by brush, gives constantly changing views of the beautiful Ukiah valley to the west, and of other valleys connecting with it on the north and the south. All about and to the east is a far wilder scene. For mile after mile, slope after slope, hill after hill, far-stretching ranges bear the same covering of Chemisal, and in the general view scarcely a shrub, tree or mass of rock rises above the lonesomely monotonous mass, except for infrequent groves of the straight and symmetrical west coast Scrub Pine, *Pinus attenuata*, on prominent points. Near at hand encircling ranges form a large basin which in turn is filled with a confused medley of lower ridges and hills. Rising head and shoulders above the wild Chemise region to the north and west, high snow-covered mountains can be seen, Pine forests ascending far up their slopes. The great dome to the north-east is Snow Mountain. In the middle rises Pine Mountain, a mass of conifers to its summit, while to the north the long ridge of San Hedrin can be seen. The long expanse of wild country is only broken by a tiny vale in the basin below. Among these thousands of acres of wilderness, perhaps forty acres form a rich little valley, watered by mountain springs and giving a good home-stead to a mountaineer. Like an oasis in a desert, it intensifies by contrast the loneliness of the surroundings. Desolate and barren it may seem, but I have found this wild region peculiarly rich in beautiful spots, and its inaccessibility shelters many a beautiful flower. Pretty little

valleys are hidden in the most unsuspected places, and the freshly burned-over Chemise is a rich field for the plant hunter.

A typical Chemise valley lies just north of Red Mountain, on which is the curious grove of *Cupressus Macnabiana* described in a previous number of GARDEN AND FOREST (see vol. ix., p. 233). Lost Valley is well named, for come upon it from which direction you may, it is a surprise. Two vales wind in sinuous curves through dense brush, and coming together form a broader vale containing a swamp of four or five acres. The little valley is closely hemmed by a dense growth of Chemise and Scrub Oaks, but not one intrudes into its grassy limits. Situated at about two thousand feet altitude, its climate is cool, and its growing season is at its height when in the valley below the dry summer has begun. Frosts come frequently and at all seasons, but the vegetation seems to have peculiar powers of withstanding them. Short Bunch Grass grows over the drier portions, and the swamp is a tangle of immense Thistles and Water Grasses, mingled in the fall with Golden-rod. Swamp plants follow the little watercourses. In July, *Lilium pardalinum* may be seen lifting its scarlet and yellow flowers above the weeds, and in late June handsome pale blue *Camassia* flowers in abundance throughout the wetter part of the place. Indeed, bulbous plants would quite possess the valley were they not kept in check by the gophers, whose underground passages are everywhere that the water permits. In June a blue *Brodiaea* grows in great abundance, and a little later *Calochortus lilacinus*, dwarfed as befits its high home, lifts its pretty lilac cups among the grass-blades. The tiny dwarfed plants and little cups of *C. venustus*, var. *oculatus*, which as the valley dries up are to be seen in the high portions, are little like the grand blossoms of the same plant in the valley below, and the rich purple tints seem unnatural. As little to be recognized are the small flowers and short leaves of the high mountain form of *Iris macrosiphon*, which is quite plentiful in the gritty soil next the side of the vale.

Nature is rich in oddities here. Down in the swamp a great Thistle grows; its woolly stems rise five or six feet high. The same plant grows in the higher parts of Lost Valley in a dwarfed form, the white leaves scarcely rising above the ground and the thick head set close down in them. The whole plant is more like a Cactus than the lofty plant of the swamp. Two *Godetias* abound in the late spring. *G. viminea* also grows below in the valley. It is one of our showiest plants, a lovely slender-stemmed annual, the flower having a red centre. The other *Godetia* has a pale, rather inconspicuous flower; it has a tendency to form round mats with many stems. All about the edge of the valley the soil is dry and gritty, and there can be seen large beds of our common St. John's-wort, a species with short stems six inches high and a very pretty yellow flower. It is one of the hardiest of flowers and thrives in the little dry openings throughout the Chemise country. We have few more delicately beautiful flowers. *Sysyrinchium bellum* is not uncommon.

I well remember a lovely lateral vale which I happened upon a few years ago. A fire had deadened the brush and invigorated the Columbinas of the *Aquilegia truncata* type. There were hundreds of plants in full blossom, and so thick as to exclude all other species. This five-spurred flower is always beautiful, but I have never seen it to such advantage since nor before. In May the common Buttercup, *Ranunculus macranthus*, tinged the vale with yellow. Later there are many composites, and even in the fall the succession of bloom is kept up in the swamp and about the spring.

Four years ago the finest wood of *Pinus attenuata* I have ever seen stood on the slopes of the hill at the head of the valley, clean, symmetrical and straight-limbed, and as thick as the trees could well grow. A fire swept through, and now only bare trunks are left. With them, however, death is the beginning of a new and more abundant life. The fire that destroys the parents releases from their long

imprisonment in the cones the abundant seeds, which, falling in the still warm ashes, soon produce a more abundant growth. Now there are thousands of handsome young trees coming on. I have observed that this Pine is on the increase under prevailing conditions. It fruits at an early age, and fires seldom find it unprepared to perpetuate itself. It is of the hardiest constitution, and the seeds grow vigorously in the most barren of soils. Old trees of *P. attenuata*, gnarled, encircled by the persistent cones of many years and with dead limbs, can only be said to be picturesque, but many of the younger specimens are truly beautiful.

I suppose that of all of the shrubs of Chemise land, the Chemise itself, *Adenostoma fascicularis*, comprises fully ninety per cent. of the specimens. On the southern slopes, and on the less precipitous slopes to the west and northwest, it rules almost to the exclusion of all other shrubs. It belongs to the Rose family and is an evergreen with linear Heath-like leaves, a light-colored stringy bark and brittle wood. In late spring it produces an abundance of whitish flowers with green centres, and they are followed by seed-pods concealed by the tawny remains of the flowers which persist till fall. While it is overwhelmingly predominant in its realm, it lives on familiar terms with a great variety of shrubs or dwarfed trees as well fitted as itself to endure the hard conditions. On the driest ridges can be seen a stiff, spiny-looking shrub with small elliptic leaves, thinly distributed and grayish bark. In its season it has short racemes of very fragrant white flowers, which perfume the mountain wastes. This is *Ceanothus sorediatus* in its high mountain form.

Here and there throughout the Chemise, in single tufts or in copses, the California Holly grows, or, as the Mexicans called it, "Toyon." It is an evergreen with large, glossy, serrated leaves. In midsummer it produces its white flowers and forms its paniced clusters of berries. These gain color as the season advances, and by the mid-winter holidays are a glowing wealth of crimson. For a long time the bright masses show against the dark foliage and lighten up the brushy expanse. On the highest ridges, where the summer heat is greatest and the soil the driest, and even the hardy Chemise takes on a stunted form, can be seen another extremely interesting shrub, *Pickeringia montana*, which is excelled by none of its Leguminous relatives when in full flower. At other times one sees a thin-leaved, stiff and spine-tipped shrub, often but four or five feet high, but sometimes twelve or fifteen. The bark is light green, the leaves ovate-lanceolate. It is very beautiful when the bush is a solid mass of pea-shaped flowers of a soft flesh-pink. Its season is quite long.

Ukiah, Calif.

Carl Purdy.

Leaf-spot of Pear.

FROM observations made during the past two or three years it has become apparent that what is called "leaf-spot" of the Pear in this country, and generally attributed to the fungus known as *Entomosporium maculatum*, is not wholly due to this fungus, but in many cases, perhaps the majority, is caused by an entirely different parasite. This emphasizes the need of expert examination of plant diseases when an occasion arises for writing upon these subjects, if one wishes to speak with as much accuracy concerning the name of the plant as would be desired when writing of potatoes. For some time I had been desirous of obtaining this fungus, *E. maculatum*, on the Pear in the vicinity of Ithaca, for a study of its life-history. And while the fungus on Quince leaves and fruit has always been in considerable quantity here I have never been able to find it on the Pear. A bulletin describing the results of spraying for the Pear leaf-spot in an orchard about two miles from Ithaca suggested to me that I might find the desired fungus here. The orchard was visited early in the spring in order to inspect the dead leaves in the hope of finding, not only the conidial form of the *Entomosporium* on the leaves which had been lying on the ground

during the winter, but also the perfect stage, both of which stages of the fungus I had found on Quince leaves which had been lying on the ground in an orchard during the winter. Nothing was found, however, which could in any way be considered connected with the *Entomosporium*. On the other hand, two species of the genus *Sphærella* were found on the Pear leaves, as follows, *Sphærella sentina* and *S. Pyri*.

This led me in the summer of 1895 to look more carefully for the *Entomosporium* on spotted Pear leaves. The first diseased leaves which came to my notice were on large nursery trees in the horticultural grounds of Cornell University. The older spots furnished various saprophytic fungi like *Cladosporium herbarum* and pycnidial forms of *Pleospora herbarum*, but in no case were the spores of the *Entomosporium* to be found. On the other hand, in the younger spots there was found abundantly a fungus belonging to the genus *Septoria*, a genus which furnishes many species at whose door is laid many leaf-spots of various plants. Ordinarily the spots on the Pear leaves caused by this *Septoria* would not be noticed to differ from those caused by the *Entomosporium*, but careful comparison reveals several points of difference. Many of the spots are slightly larger, and there is a great tendency for the spots to be angular and somewhat elongated in shape, while the spots of *Entomosporium* are more nearly circular. Upon the under side of the leaf at certain stages there appear minute jet-black points, which do not appear in the spots of *Entomosporium*. The microscope reveals these black points to be made up of long coiled strings of spores which have oozed out of the pycnidium of the *Septoria*. The individual spores, which are very long, slender and more or less curved or flexuous, have a light green tinge, while in mass they appear black.

Next the orchard was visited where spraying experiments had been carried on against the *Entomosporium*, and no trace of this fungus was found. But on several trees the *Septoria* was present, and in one case the tree was badly blighted, nearly every leaf being affected. Investigations were then made of several large Pear orchards at Geneva, New York, and while both the *Septoria* and *Entomosporium* were found on a great many trees, the *Septoria* was by far in the majority, and in many cases both fungi appeared on the same leaf. Material was also secured from a large number of varieties of Pear-trees in a nursery at Syracuse, and here also the *Septoria* predominated.

During June, 1896, Mr. B. M. Duggar was appointed on the staff of the Botanical Department as Cryptogamic Botanist of the experiment station here, and the investigation was placed in his charge. His observations have confirmed those of mine concerning the prevalence of the *Septoria* in the etiology of Pear leaf-spot, the *Septoria* being more abundant than the *Entomosporium*. He has been able to obtain a knowledge of a still wider range of the *Septoria* in this state, and has also received it from a number of other states. He is preparing the matter for a bulletin, and would welcome contributions of Pear leaves supposed to be affected with the *Entomosporium* from any section of the country, in order that the distribution of the two fungi may be obtained. To those who are interested I would suggest dried material now in the herbarium, the collection of Pear leaves in the early spring which have been on the ground during the winter, and freshly diseased leaves later in the season, and that these be communicated to the department here, since cultures are now in progress to determine the life history of the fungus, and it is desired to obtain and cultivate as many of the species of the genus *Sphærella* as possible, since species of *Septoria* have been in some cases connected with species of *Sphærella*.

Another important fact in connection with the *Entomosporium* has also come to light during my study of this fungus. This is the discovery in this country of the perfect fungus which Sorauer discovered in Europe in connection with *E. Mespili* on leaves of *Cotoneaster tomentosa* and *Pirus communis*.

Reference has been made above to my discovery of the perfect form on leaves of the Quince which had lain on the ground during the winter. This was in the spring of 1895, and on the same leaves were also spores of the conidial stage of the *Entomosporium maculatum*. In discussing this *Entomosporium* in the report of the Department of Agriculture (1888), Professor Scribner cites Sorauer's work on the perfect stage, and reproduces some of the figures, stating that no other observer had at that time confirmed Sorauer's discovery. Aside from the interest and importance attaching to the discovery of this form in the United States on another host, it is of interest to note that Sorauer places the fungus in the genus *Stigmatea*, which resembles *Sphærella* in the form of the perithecia and ascospores, but differs in possessing paraphyses and in the context of the perithecia. The fungus seems to me rather to belong to the *Discomycetes*, and is probably a member of the genus *Fabræa*. This genus belongs to a family of the *Discomycetes* in which the fruit body at first is closed, as in the *Pyrenomyces*, to which group *Stigmatea* belongs, but later the fruit body opens in the form of a cup, so that care is needed in observing the later stages of the fruit body to determine its true character. Also in the case of the genus *Fabræa*, when the plant is dry the margins of the cup-shaped fruit body collapse and fold together, so that it gives the appearance of the closed fruit body of the *Pyrenomyces*. On moistening the plant, however, expansion takes place, the margins part, and a broad surface formed by the exposed ends of the asci comes to view.

From the apparent wide distribution of the *Septoria* and from the very probable confusion with the *Entomosporium* in the case of some spraying experiments, it would seem that the success which has attended the efforts to combat Pear leaf-spot demonstrates by circumstantial evidence that spraying in the usual way will check the *Septoria*. In connection with nursery stock, one year's stock will sometimes be affected almost entirely with the *Entomosporium*, and another year's stock almost entirely with the *Septoria*. This suggests that in budding nursery stock or in grafting, the buds in such cases have been taken from trees affected either with the *Septoria* or *Entomosporium*; in fact, that one of the prolific causes of the appearance of the spot in nurseries may be traced to the buds which already may have the germs of the disease. If this should prove to be true, caution in the selection of budding stock, or in its disinfection before grafting, could be recommended.

Cornell University.

George F. Atkinson.

Foreign Correspondence.

London Letter.

ANOIGANTHUS BREVIFLORUS.—This south African bulbous plant, valuable for the conservatory in winter, is related to the *Sternbergias* and *Cyrtanthuses*, and is as easily managed as a *Daffodil*. The bulb is ovoid, two inches long; the leaves are strap-shaped, erect, about a foot long, deciduous, new ones being developed along with the flowers. These are produced in umbels on erect scapes a foot long, strong plants having ten or a dozen flowers in the umbel. They are tubular, between one and two inches long, at first erect, afterward more or less drooping, their color a bright *Daffodil-yellow*. In the Cape-house at Kew there are some fine examples of this plant in flower; they are mixed with a group of white-flowered *Freesias*. During the summer the *Anoiganthus* is grown in a sunny frame, and after the leaves die off in autumn they are kept dry till the flower-scapes begin to appear. They prefer a rich loamy soil, with plenty of water while in growth. The genus is monotypic. It was introduced from Natal about eight years ago.

KNIPHOFIA PRIMULINA.—This is a new species which Mr. Baker has described from plants now flowering in the temperate house at Kew, where it has been an attraction for the past month or so. It has the general characters of *Kniphofia Natalensis*, but the leaves are three feet long and an inch broad; the scape is three feet high, bearing a dense

raceme of flowers six inches long; the flowers are more than an inch long, tubular, the segments scarcely spreading, and the stamens are about half as long again as the tube. The color of the flowers is bright primrose-yellow. Kew is indebted to Herr Max Leichtlin for this plant, who sent it in 1894 with the information that it was from Natal and that it flowered in winter. When it first flowered it

to interference with well-established plant names except for very strong reasons. It appears that Professor Pfitzer, of Heidelberg, has thought fit to revive certain obsolete names and to divide the old genus *Cypripedium* into four. Until now we have recognized two, namely, *Cypripedium* and *Selenipedium*, the latter name being applied to all the South American representatives of the tribe. Even this



Fig. 10.—*Hoodia Gordonii*.—See page 76.

was thought to be a pale form of *K. Natalensis*. Grown in pots to flower in the greenhouse in winter it is a useful decorative plant, or it may be grown in the open ground and lifted in October, to be planted under glass.

CYPRIPEDIUM.—In the December number of *The Orchid Review*, Mr. Rolfe published a revision of *Cypripediæ* which is likely to meet with the disapproval of those who object

name, however, was not recognized by many, Veitch declining to adopt it in his *Manual of Orchids*. The new arrangement is as follows:

1. *Cypripedium* proper is to be limited to the terrestrial deciduous species represented by *C. spectabile*, *C. japonicum*, *C. calceolus*, etc.
2. *Paphiopedium* is the proposed name for all the Old

World species not included in 1; these are represented by *C. insigne*, *C. Stonei*, *C. niveum*, etc. These were the *Eucypripedia* of Bentham & Hooker.

3. *Selenipedium*. This name is to be limited to several South American species, none of which have ever been introduced. Examples, *S. Chica* and *S. palmifolium*.

4. *Phragmopedium* is the name proposed for all the cultivated plants hitherto known as *Selenipediums*. These are all natives of South America; examples, *P. longifolium*, *P. candatum*, *P. Schlimii*.

Whatever cultivators may think of this new arrangement, botanists, including Sir Joseph Hooker, are of opinion that it is justifiable. Apart from the question of convenience, we have the fact that 1, 2 and 4 are well differentiated in habit and behavior under cultivation. They have never been intercrossed, although seedlings have been raised from crosses between 2 and 4, but they have invariably perished before flowering.

ORCHIDS FROM SEEDS.—In my last letter I suggested that choice species and varieties of Orchids should be raised from seeds obtained artificially. I have since been informed that several Orchid breeders in this country have seedlings of such, but I am requested to withhold the names of the plants, lest it might affect the commercial value of the parents. In *The Gardeners' Chronicle* this week there is a note headed "A Scarcity of Orchids," in which attention is called to the scarcity in a wild state of various *Cattleyas* and other Orchids, due partly to the insatiability of collectors, and partly to the clearing of the land for the cultivation of Coffee. "This Coffee industry in Colombia is extending at the expense of the Orchid forests, for it happens that the Coffee region is exactly the Orchid region." Breeders have succeeded in raising from seeds a large number of species of different genera, including *Odontoglossum*, *Miltonia*, *Zygopetalum*, *Cattleya*, *Dendrobium*, *Phalænopsis*, *Phajus*, *Cypripedium*, etc., and there does not appear to be any obstacle to the raising of many other kinds from seeds matured under cultivation. Evidently this is the direction to which we must soon perforce turn for a supply of many Orchids.

London.

W. Watson.

New or Little-known Plants.

Hoodia.

HOODIA is closely related to *Stapelia* and was once included in that genus. Four species are known, all natives of hot, dry regions in south Africa. They are remarkable for their many-ridged, spine-clothed fleshy stems, which are more suggestive of *Cereus* than *Stapelia*, and also for their large saucer-shaped flowers. These are colored yellowish or reddish brown and are of a disagreeable odor.

If they had not hitherto proved so difficult to keep alive under artificial treatment, *Hoodias* would certainly be now as well known in gardens as the commonest *Stapelias*. It is possible that we may yet discover how they ought to be treated so as to keep them healthy; at any rate, plants are now being tried again at Kew. The accompanying illustration (see p. 75) represents a plant flowered by Mr. Armstrong, of Port Elizabeth, to whom Kew is indebted for plants. *Hoodia Gordoni* was discovered near the Orange River more than a century ago. Fifty years later it was rediscovered by Burke, who was sent by the Earl of Derby to collect plants in south Africa, and he sent home living plants of it which were grown at Knowsley, but they do not appear to have ever flowered there. In 1874 Sir Henry Barkly, Governor of the Cape, obtained two specimens of it, one of which was sent to Kew, where it flowered in 1875, but it died the following year. A figure prepared from this plant by Fitch was published in *The Botanical Magazine*, t. 6228.

The plant has numerous stems in a cluster, suggestive of a *Cactus* in habit and appearance; they are from a foot to a foot and a half long, two inches in diameter, ridged

longitudinally, the ridges clothed with closely set yellow prickles half an inch long. The flowers are produced in clusters of two or three near the apex of the stem; they are rotate, nearly flat, four inches in diameter, the lobes short, or scarcely apparent, abruptly apiculate, yellowish brown flushed with rose, and an eye-like zone of rose surrounding the crimson corona.

A correspondent in Carnarvon, about 300 miles inland from Cape Town, writes: "It may interest you to know that *Hoodia Gordoni* is very plentiful about here. . . . It grows mostly on the slopes of dolorite-capped hills, and ought to thrive in the moist climate of England, with not more than one watering about every six months. Here it does well with a good rain in March and another in October. It also gets assistance from the heavy dews, as it generally prefers the lower side of a dolorite boulder from which the lightest rain or heavy dew would run off. I have, however, found numerous plants on a bare flat, and they appeared to thrive as well as the others."

The plant represented here is only a small one, tufts of from twelve to twenty stems being common, and these all flower together, forming a very striking object.

The other species known are *Hoodia Barklyi*, flowered in the Cape Town Botanic Garden in 1873; *H. Bainii*, flowered at Kew in 1878 and figured in *The Botanical Magazine*, t. 6348, and *H. Curreri*, which does not appear to have ever been cultivated.

London.

W. Watson.

Cultural Department.

Lachenalias.

MIDWINTER flowering plants are not, and never will be, too plentiful. This is the one period that taxes the skill of those who have to provide these in quantity, more especially from the end of the *Chrysanthemum* season until the coming in of Dutch bulbs in spring. *Freeseas* from the Cape of Good Hope are of comparatively recent origin in gardens and fill a place that will never again be vacant, and another valuable set of bulbs, also from the same region, are the *Lachenalias*. These are very old residents of gardens, since the records show that they were known and cultivated as long ago as 1752, and have since been continuously grown. It does not appear, however, that more than the true species were known, and these remained unimproved down to 1880. At this late date the Rev. John Nelson, an English clergyman, raised the first seedling variety, *L. Nelsoni*, still perhaps the best of all varieties. More recently still, another clergyman has entered the same field, and to Rev. T. H. Marsh we are indebted for the kinds known as *Ruby*, *Topaz*, *Little Beauty* and *Cawston Gem*, all of which are distinct gains to gardens. They are, indeed, better than the true species, with the possible exception of *L. pendula*, which is a giant of its kind.

Most of our winter-flowering plants need an amount of care and preparation during summer that adds largely to their cost, and is not always compensated for by their value when in flower. The popularity of the *Freesia* among cultivators is largely due to the ease with which it may be stored away in early summer until time for planting in autumn. The same treatment is all that is required for *Lachenalias*, so that when they are better known they should be more generally grown. Pans, such as other bulbs are grown in, or five-inch pots, should be used, owing to their dwarf habits. The pots are more desirable, owing to their adaptability for general decorative uses. We plant in August in rich soil, and place the pots in a sunny frame until it is no longer frost-proof in early winter. *Lachenalias* dislike heat and coddling, and the cooler the house, so long as it is free from frost, the better will be the flower-spikes and the foliage. The leaves are attractive and are marked like those of some of the *Dogtooth Violets*. When the pots are brought into the greenhouse they should, if possible, be placed on a shelf close to the glass, where they can get all the air possible. The flowers will be produced from November until March if a few of the best sorts are grown.

Lachenalias seed freely, come up quickly if the seeds are sown at once, and what is more desirable, perhaps, can be obtained true from seed. This I have heard disputed, but we have them now in bloom without the least variation from the parent variety. While some of the bulbs flower the second year, the majority will take three years to bloom. There is

still a field for the hybridist, all the more enticing that the best kinds now known in gardens are of garden origin. No one seems to have yet taken in hand the crossing of the earlier gigantic *L. pendula* with the later-flowering kinds. We this season planted a lot of *L. pendula* late in winter for the express purpose of having it in bloom with *L. Nelsoni* and *L. tricolor*, and in this we have succeeded. It only remains to cross them, and we may be able to get an infusion of bright coral-red among the yellows that has not been obtained by earlier operators.

A few notes of varieties best worth growing may be in place here, though it is preferable to procure them in autumn with the other bulbs, or as soon as they can be had from Holland. *Lachenalia pendula*, before noted, is the first to bloom. Indeed, we use it with the earliest of Roman Hyacinths, with which it is a pleasing contrast in color, while the spikes are equal in vigorous development. The leaves of this species are unspotted, and as large as those of a garden Tulip. There is a variety called *Gigantea* which we have never yet grown, but hope to next year. *L. tricolor*, of which there are at least half a dozen varieties, is also one of the best. It is in flower now in best condition, and is useful either in pots or for the flowers when cut. The stems should not be cut, but gently pulled out, as *Cyclamen* flowers are pulled. This adds length to the stem, and if it is done carefully the bulbs are not injured. *L. Nelsoni* is the best of all the sorts yet grown. Its color is a bright golden yellow; it increases readily, and is a great advance over its parents, as indeed are the other garden forms already named. It is safe to assume that if these kinds are tried they will be but a beginning, and such species as *L. aurea*, *L. orchoides*, *L. Cami* and *L. quadricolor* will be added to the set, for all are beautiful and distinct. There are many more species, some of which bear the reputation of being hard to flower in gardens, but with our bright sunny summer days to ripen the bulbs, and the longer growing season in autumn, we ought to have a great advantage over European cultivators.

When one has enough bulbs, there is no prettier way to use them than in baskets. The pendulous spikes show to great advantage in this way, and if moss, with a little bone-meal, is used to grow them in the baskets will not be heavy; a great amount of water or labor will not be necessary. The great secret of cultivating bulbous plants of whatever nature is to take as much care of the plants after they have flowered as when starting them. The bulb is built up for the next year's work after the blooming time, and on this foundation depends all the returns that will be had a year hence. We often hear complaints that *Freessias* do not bloom well if home-grown bulbs are planted. This depends wholly upon the after treatment that we give them. They should never be disturbed until all signs of growth have disappeared. All the soil should then be shaken off and the bulbs stored in a cool dry place until planting time comes again.

South Lancaster, Mass.

E. O. Orpet.

Select Dwarf Stove Plants.

PROMINENT among these are the beautiful little *Bertolonias*. The delicate hues and exquisite markings of their foliage make them both showy and interesting and a welcome addition to any plant collection. It is somewhat difficult to bring out their true characteristics under ordinary stove treatment, as they require a more humid atmosphere than can usually be maintained, even in a small house. The additional shelter of a small frame should be provided where the atmospheric conditions will be much more easily regulated. A plentiful supply of water at the roots is necessary; syringing or sprinkling overhead is not advisable. The most convenient method of propagation is by cuttings, which strike readily in a moderately close propagating case filled with sharp clean sand. The pots should be thoroughly clean and well drained, and the compost open and porous. *Bertolonia Van Houttei*, *B. Legrelli*, *B. superba*, *B. marmorata* and *B. punctatissimum* are probably the best varieties found in general cultivation.

The genus *Sonerila* provides some beautiful species, all of dwarf growth and suited to ordinary stove culture. *Sonerila Hendersonii* and *S. margaritacea* are among the best sorts; they require moderate shade and plenty of moisture, and are easily propagated from cuttings. Rough leaf-mold with a plentiful addition of silver sand is a suitable soil for them. The red-veined *Fittonia Verschaffeltii* and its silvery-veined variety *argyroneura* are the two forms most commonly grown, and are among the most easily cultivated of dwarf stove plants. They love shade and moisture and grow freely in a compost

of equal parts of fibrous loam, leaf-mold and sand. On account of their creeping habit, pans are more suitable for their cultivation than pots. Snails are particularly fond of them, and if not checked will quickly disfigure the plants.

A most attractive little plant is *Tapeionites bicolor*. The metallic dark green leaves contrast admirably with the pure white flowers; the latter are borne two or three on a stem and rise just above the foliage. *T. bicolor* thrives best in a peaty soil and is propagated most easily from cuttings. Several of the dwarf forms of *Aphelandra* may be included in this class. They are beautiful both for their flowers and foliage. The flowers are produced in terminal four-sided spikes. Usually but a few blossoms are open at one time, but a succession of blossoms continues for a considerable length of time. *Aphelandra Fascinator*, *A. pumila* and *A. Roezlii* are three of the best dwarf forms. They may be propagated either from cuttings or seeds, and some of the varieties produce seeds freely. A light fibrous soil is the best. They need plentiful watering during their growing season, but when not in active growth should be kept rather dry. They are generally cultivated in pots, but I have seen them growing and flowering admirably planted out in rock-work.

Higginsia discolor and *H. regalis* are two lovely dwarf plants. The former grows about six inches high, and the latter to nearly twice that height. Propagated by cuttings they are of easy culture under ordinary stove treatment. The leaves of both species are shining green on the surface and purple-tinted below, *H. discolor* being the most attractive on account of the rich, satiny gloss of the upper surface.

A neat and almost continuous flowering little plant is *Tetanema Mexicana*, commonly called the Mexican Foxglove. The flowers are borne in clusters on upright stalks about four inches high. The ground-color is purple, the markings of a light violet color. It produces seeds freely and is easily increased by this means.

Tarrytown, N. Y.

William Scott.

Stag-horn Ferns.

OWING to the eccentric, but graceful, shapes which their leaves assume, the *Platyceriums*, or Stag-horn Ferns, as they are commonly called, are plants of prime importance for decoration, and they are specially useful in the stove and greenhouse. The species, seven or eight in number, are widely distributed over tropical and temperate countries, and all of them, with the exception of *Platycerium alcorni* and its forms, require a fairly warm house for their perfect development. Being epiphytal in their nature, they can be grown in a variety of ways. *P. grande* can be grown satisfactorily upon large blocks of wood or upon the dead stems of Tree Ferns, which, if large enough, make ideal abiding places for this plant, and with the addition annually of a little coarse fibrous peat it can be kept in first-rate condition for many years. *P. alcorni* also thrives in wire baskets; if it has good porous material for the roots to wander in, the entire surface and sides of the receptacle will soon be covered with foliage. For growing in pots *P. Hillii*, a recently introduced species, is the most satisfactory, as its habit is more upright than that of the others. When grown in pots it is advisable to break off part of one side and then to place the plant on that side so that the surface of the soil will not be entirely covered up with the sterile leaves, and thus make it troublesome to supply the plant with as much water as it needs. Since a considerable portion of the roots will be found layered between the bases of the sterile leaves, it is a good practice to insert between the leaves a little rough peat and moss to absorb water and hold it as long as possible. *Platyceriums* will thrive in almost any kind of open well-drained soil, but to have the foliage grow to full dimensions and give the best architectural effect the mixture must be open, so that the roots can penetrate it with perfect freedom, a condition in which they seem to delight. Sphagnum moss, fibrous peat or the coarse root masses of some of the *Osmundas*, with lumps of charcoal freely interspersed, are substances suitable for older plants. For young pieces rough leaf-mold and chopped moss answer well enough. Old plants of the species which have round sterile leaves are of such a peculiar growth that it is difficult to furnish them with a proper receptacle, but a piece of ordinary wire netting from twenty-four to thirty inches long and about twelve inches wide will answer. The ends of this should be brought together and fastened with wire in the shape of a cylinder. If one end is obstructed so that the roll when in an upright position will hold a coarse root mixture, large pieces can either be fastened to it on one side or all about it, and it can be hung up to the roof of the conservatory. *P. Hillii*, *P. alcorni* and its variety

Majus have more or less round-shaped sterile leaves and nearly upright fertile ones. *P. grande*, *P. Willenckii* and *P. stemmaria* have very ornamental sterile fronds, especially the two former, which are beautifully divided. The fertile ones are drooping and gracefully cut. These Ferns can be propagated by sowing the spores of which old plants give a very plentiful supply, or by the root-buds which develop freely on all the species except *P. grande*.

Botanic Garden, Washington, D. C.

G. W. Oliver.

Hardy Cyclamens.

AMONG the interesting plants which emerged from the melting snow last week were some Taurian Cyclamens with beautifully mottled leaves and brightly colored flowers. The Cyclamens have been so much improved in size of flowers and grown under glass so generally that we are apt to forget that many of the numerous species are hardy and very attractive in suitable borders. The hardiness, as in the case of many so-called hardy plants, is comparative, for they will not endure our winters except under certain precautions of planting; but if so established they are fairly reliable, and few small plants are more dainty and attractive. The first requisite to the successful cultivation of Cyclamens of all species is perfect drainage, and this must be arranged for in the borders or there is no chance for success. A good soil is an open sandy one with a trifle of peat, and the best position a raised one where they will have slight shade, possibly under deciduous trees. Limestone is said to be helpful to their growth; broken up old mortar is a good substitute, and will help provide drainage. The Cyclamens are natives of the Mediterranean region from Spain to Syria, and there is at least one African species.

Among the various species flowers may be had at all seasons of the year. *Cyclamen Coum*, *C. Ibericum*, *C. repandum* and *C. Persicum* flower in January and until May. *C. Europæum* flowers in summer. *C. Neapolitanum*, *C. Græcum*, *C. Cilicicum* and *C. Cyprium* from September to December, and *C. Africanum* in December. The flowers of *C. Græcum* and *C. Neapolitanum* appear before the leaves; in the other species they appear together. Of these, *C. Africanum*, from Algiers, is tender, but is an interesting greenhouse plant, usually having a monster corm six inches or more in diameter. *C. Persicum* is also tender, and is the parent from which all the modern large-flowered varieties of the greenhouse sorts have been evolved. These are certainly remarkable triumphs of the gardener's skill, but lately they have shown a tendency to further changes in the way of cresting and doubling which will try the temper of the botanist.

The other eight species described by Baker will probably be found hardy in gardens under conditions noted above. If a trial is attempted, perhaps *Cyclamen Coum* would be the most likely to succeed. My garden is cold, wet and clayey, and these plants do not stay long with me, yet my losses have been, I think, more from careless planting and treatment than from real difficulty in growing the plants.

Elizabeth, N. J.

J. N. Gerard.

Propagating Chrysanthemums.

CUTTINGS of Chrysanthemums intended for specimen plants may be put in to advantage now. We have started them earlier, but, taking everything into consideration, nothing is gained unless very large plants are desired, and it is a question whether an extremely large plant is evidence of cultural skill. In any event, the feat accomplished, it is no longer considered commendable. The Massachusetts Horticultural Society has wisely, I think, lowered the size limit in pots from twelve to ten inches in diameter.

In selecting cuttings we prefer stout suckers, avoiding those found on the old stems as liable to run to bloom prematurely. No special treatment is required in rooting cuttings; any piece will grow, even a leaf, and leaf-cuttings often make very fine plants. It is the only way to fix a sport. Plenty of water and air is essential, and the mistake of giving too much warmth is the most common one. From the time the cuttings are rooted they must be kept growing steadily. It ruins them to leave them in the cutting-bed when they are once rooted, as they become hardened; such plants often come from the dealers, and they never make specimens. They can be detected at a glance. We take the soft tips and endeavor also to get them to start afresh from the root-stock. Cuttings got in this way are the only ones we can expect to succeed with. We start with four cuttings of a kind, select two to grow, and as exhibition time approaches finish the best one.

Wellesley, Mass.

T. D. Hatfield.

Correspondence.

Notes from Wellesley.

To the Editor of GARDEN AND FOREST:

Sir,—A day can be profitably spent in making a tour of the greenhouses in and about Wellesley in winter, although the places are seen at their best early in June, when *Rhododendrons* and *Azaleas* are in flower, or in October and early November when autumn tints light up the landscape.

In the greenhouses belonging to Wellesley College, the head-gardener, Mr. Butler, generally has something good to show visitors, although his space is somewhat limited and the structures are not of a very modern type. *Statice Halfordi*, a garden hybrid of *S. macrophylla*, was represented here ten days ago by some fine plants in full bloom. This *Statice*, although one of the most handsome decorative plants in cultivation for winter flowering in a cool greenhouse, is by no means common. *Acacia pubescens*, of which Mr. Butler has two standards, seven to eight feet high, with well-expanded heads, was flowering well. Although it has been in cultivation more than a hundred years, no plant has been found to take the place of *A. pubescens* when thickly clothed with its racemes of yellow flowers. It is to be regretted that some of our nurseries have not worked up a stock of *Acacias* in variety. No American firm catalogues them, so far as I know. In addition to *A. pubescens*, such old but beautiful sorts as *A. Drummondii*, *A. dealbata*, *A. Riceana*, *A. lineata* and others, which are probably familiar to the oldest plantmen, should have a place in every establishment where hard-wooded plants are grown. A specimen plant of *Dendrobium nobile*, which annually produces nearly a thousand blooms, was bristling with buds, and in a few weeks will be a mass of flowers. *Angræcum sesquipedale*, one of the best of winter-flowering Orchids, was showing its great ivory-white flowers, the sepals and petals spread out like rays six inches across. *Odontoglossum crispum* and *O. triumphans* were pushing up stout spikes, and *O. pulchellum majus*, a healthy little sweet-scented white species, was flowering finely. In a warm house *Phalænopsis amabilis* and the beautiful white variety, *P. grandiflora*, were in flower; the leaves of these are tough and leathery, and Mr. Butler says they never fail to flower well. They are grown in a much lighter position than is usually accorded *Phalænopsis*.

At Mr. H. H. Hunnewell's, the beautiful new *Begonia*, *Gloire de Lorraine*, a cross between *B. Socotrana* and *B. Drejei*, was covered with clear, rosy carmine flowers. This variety ought to become highly popular when it is sufficiently known; from its habit it promises to be suitable for a basket plant. This species was quite largely grown in England last summer, and it is said to bloom well out-of-doors there. No other *Begonia* bears flowers of so beautiful a color. *Streptosolon Jamesoni*, grown as a standard, was effective in one of the cool houses. Mr. Norris holds back as many Orchids as possible to flower during the *Rhododendron* season, but some good species were in bloom. *Lælia anceps* was represented in some huge baskets, the plants carrying many spikes. The white forms, *L. anceps Sanderiana* and *L. Schroederiana*, *Lælio-Cattleya Pallas* and *Cattleya Trianae*, were also in flower in the *Cattleya*-house. In the Orange-house the fine specimen of *Clematis indivisa*, already figured in GARDEN AND FOREST (see vol. vi., p. 167), covers a large portion of the roof, and was in beautiful flower. *Cypripedium Harrisonianum* (*barbatum* × *villosum*) was represented by several good specimens. *Phalænopsis amabilis*, *P. Stuartiana*, *P. Schilleriana* and *P. grandiflora* were all in flower.

At Mrs. B. P. Cheney's beautiful place in South Natick, Mr. John Barr had a magnificent show of Cyclamens. Several hundred of these plants are grown, chiefly in eight and ten inch pots, and one side-stage about one hundred feet in length is entirely devoted to them. Others are being held back in a cold structure. The range of colors, size of flower, foliage and quantity of flowers to the plant were all that could be desired. Mr. Barr usually takes some of the leading honors for these plants at the Boston Spring Show. If he can keep his plants back this year until the third week in March they will not easily be surpassed. Roses, Carnations and all other plants on this place were clean and thrifty-looking. The early grapevines were just beginning to break nicely, and the appearance of the canes gave promise of fine bunches.

A visit to Wellesley would not be complete without a call on the veteran florist, Mr. Joseph Tailby, whose compact and well-kept establishment is close to the Boston and Albany Station. Mr. Tailby's specialty, as is well known, is Carnations. Mrs. Fisher is grown largely here and surprisingly well. One large house and part of another are devoted to it. Mr. Tailby still finds it the most profitable variety of the many he

grows. William Scott is the favorite pink variety, and F. Mangold is considered the best crimson. A bed of a promising scarlet seedling, Portia x E. G. Hill, is notable. The flower is a good clear scarlet, larger than either parent, calyx good and stem stiff. There are also some promising crimson seedlings; the old Clove was used as one of the parents, and the seedlings have a delightful clove odor. A house of Violets looked clean and healthy, Marie Louise, Lady Hume Campbell and Swanley White being the double kinds grown, and California the leading single variety. A large number of plants of Crimson Rambler Rose in seven and eight inch pots promise to be in flower by Easter, and also of the new forcing *Spiræa astilboides floribunda*; the latter is too tall and ungainly to become a popular variety.

A run on the electric cars from Wellesley brings one close to the estate of Mr. David Nevins, at South Framingham. A fine new greenhouse, 105 by 21 feet, has recently been completed here, and Mr. A. McKay already has it well filled. A bench of Violets in eight and ten inch pots makes a remarkably good showing; the plants had been brought in from a cold frame two weeks before, and they were a mass of bloom. I counted thirty-five to forty large perfect flowers hanging around the sides of some of the pots, and masses of buds were pushing up. It is not so much the quantity of the flowers as their immense size which excited surprise and admiration. The largest flowers noted were of Farquhar. This variety seems quite distinct from any other I am acquainted with, in flower, foliage and in general habit. Mr. McKay says he can easily pick out any stray plants of Farquhar among those of Marie Louise and Lady H. Campbell at the first glance. Other varieties splendidly grown are Swanley White, Marie Louise, Lady H. Campbell, California and the old Czar. Plants in cold frames were equally as thrifty here as those grown indoors. A frame of Violets here received the first prize by the Massachusetts Horticultural Society last spring in the competition for the best house or frame of Violets. A house of hybrid Perpetual Roses, planted out in solid beds, were pushing stout growths. Flowers from this house have surpassed all others at the Boston Spring Show for two seasons past. Mr. McKay has an interesting collection of Orchids, all of which looked thrifty. Some good plants of *Dendrobium nobile* (Sander's variety), *D. Wardianum* and *D. formosum giganteum* were in flower. A batch of Cauliflower, Early Erfurt, in eight-inch pots, were producing good heads ready for cutting.

Mr. William Nicholson, of Framingham, is one of the most successful all-round cultivators of Carnations in Massachusetts. Two large structures and two small ones are devoted to these plants. This season they are looking better even than in previous years, and they have always looked well heretofore. Many varieties are grown, and all were equally vigorous and were flowering freely. Eldorado, William Scott, Daybreak, Minnie Cook, Alaska, F. Mangold, Hector, Thomas Cartledge, Nicholson, Edith Foster and Della Fox were notably good; the last named is not liked as generally as Daybreak. Edith Foster, white, is popular, and Eldorado blooms as freely here as William Scott. A bench of white *Antirrhinum*s suggested the value of this flower for cutting. A fine collection of flowering Begonias was an attraction here. These are specially pleasing at this season. A house, 100 by 15 feet, filled with Tomatoes planted after *Chrysanthemums* were cut, was setting a heavy crop, Eclipse being the kind most largely grown.

Taunton, Mass.

W. N. Craig.

Recent Publications.

The Forcing Book. By L. H. Bailey. Macmillan Co., New York.

Ten years ago one could find forced Radishes, Lettuce and occasionally Cauliflower in small quantities in the New York winter markets, but there was nothing like a regular supply of them, and, indeed, there was hardly any demand for them. The business of growing vegetables under glass has since then developed more rapidly than any other branch of horticulture in this country, and this little manual, which belongs to the useful Garden Craft Series, has been prepared to set forth the principles and explain the details of its practice. Since plants in glass houses are entirely under artificial conditions their cultivation demands special skill and the most watchful care. Novices therefore need instruction from the beginning, and Professor Bailey, who has given personal attention to experiments in growing

vegetables in connection with his horticultural work in the University and in the experiment station, has qualified himself as a teacher by making practical tests of various methods. The work properly begins with a brief treatise on the construction and management of forcing-houses, for, since the grower must make his own climate as well as his soil, it is quite as essential that he should be able at will to create and command these conditions as it is that he should know exactly what the conditions are which each crop needs. The discussion of the various forms of houses, with their structural details, is very complete, although concise, and for the space it takes it gives more valuable information than can be found elsewhere in the same compass. All such practical questions as would be treated under the head of soil, fertilizers, irrigation, shading, pollination, etc., have received careful study, and the beginner can feel safe in following them to the letter. The book is written primarily for those who intend to take up the winter growing of vegetables as a business, but there are few gardeners with a glass house at command who can resist the challenge to try their skill at raising a melon for Christmas dessert, and few persons who do not enjoy the occasional luxury of a dish of fresh asparagus or tomatoes out of season.

The book is thoroughly up to date, and contains not only a selection of the most approved varieties of each crop for forcing in this country, but it presents the results of the most recent studies in cultural practice and summarizes the results of such instructive investigations as those of Professor Galloway in reference to the mechanical properties of soil essential to the production of the best Lettuce; Professor Munson's experiments in pollinating Tomatoes at the Maine Station; the Connecticut experiments with chemical fertilizers in artificial soil; the tests with electric light in Cornell, West Virginia and elsewhere; Green's plan of subirrigation, or watering by means of underground tiles, and many other practices and processes which have been explained from time to time in this journal.

The manual makes a handy volume of 260 pages, helpfully illustrated and carefully indexed.

Notes.

Lilium auratum is grown to its highest perfection by Mr. G. F. Wilson at his home near Weybridge, Surrey, England. A single stem sometimes carries as many as sixty flowers in a great pyramid whose summit is six and a half feet high.

Since October 1st 622,324 barrels of domestic potatoes have passed through the New York market, somewhat more than two-thirds the quantity handled in the corresponding period a year ago. The receipts of the home crop during last week amounted to 31,314 barrels, besides 1,800 sacks from Great Britain, 200 sacks from Germany and 566 barrels from Bermuda and the West Indies.

The Board of Trade of California, following the example of the Royal Horticultural Society of England and similar associations in various countries, has appointed a subcommittee to promote the International Horticultural Exhibition in Hamburg, which is to continue from May until October of the present year with one continuous show, and special exhibitions for plants and flowers at the time of their best season.

The immense quantities of fruits consumed in New York city, and forwarded from this centre to other sections of the country, are suggested in the arrival last week on a brig from Porto Cortez of 91,000 cocoanuts. Although this fruit, even in its manufactured form, is but occasionally used in families, and then in small quantities, 1,687,500 cocoanuts have arrived at this port since the first of the year.

The plant, often called the Water Hyacinth, *Pontederia crassipes*, has been naturalized in some of the rivers of our south Atlantic and Gulf states, and has increased so rapidly that it covers the surface of the water for great distances. In the St. John's River, Florida, and in some of the canals about New Orleans it is difficult for steamers to work their way through this raft of vegetation, and when they do the plants close in behind the boat and occupy the surface completely as before. The obstruction to navigation has become so serious that an

appropriation of \$10,000 was made last week by the Senate of the United States to enable the Secretary of War to study means of freeing our watercourses from this nuisance.

Steam has shortened the time of ocean transit to such a degree that the perishable fruit on street-stands of almost any city in the world may have come from a remote part of another continent. Good peaches from South Africa are now on sale in the London markets and command \$2.50 for a box containing twenty. The first installment of the apple crop from Tasmania will reach London about April 20th, and shipments will arrive regularly every week until July. About 100,000 cases are expected.

Mr. C. L. Allen has a good word to say for the old Madagascar Periwinkle as one of the most pleasing of plants which can be used for bedding, since it can be had covered from June until frost with flowers which are admirably set off by glossy green foliage. If seeds are sown now they will produce plants that will be of flowering size in June, and the seedlings will come true to the type of flower, whether pure white, rose-colored, or white with a crimson eye. If the old plants are taken up at the approach of frost and stored in boxes of sand in a warm cellar and left so dry that growth will not be encouraged they will keep well, and if the stems are cut back at the approach of warm weather they will make much stronger plants the next season and will flower earlier than those grown from seed.

The North Carolina Experiment Station has had prepared a bulletin entitled "The Home Vegetable Garden," by Professor F. W. Massey, to which a short supplement on Pests of the Garden has been added by Gerald McCarthy, the botanist of the station. Altogether, this little bulletin makes up a pamphlet of some fifty pages, which is an excellent handbook for the cultivation of vegetables for home use, not only for the latitude of North Carolina, but for a large part of the country. Besides giving a selection of the different varieties of plants, the book contains some first-rate rules for the best methods of selecting, laying out and enclosing a garden, of making and using cold frames and hot-beds, of preparing and enriching the soil and much other information which a novice ought to be grateful to have placed within his reach.

Mabel Morrison is a Rose that is not often forced, but a few blooms of it in the window of William H. Brower & Sons, on Broadway, near Twenty-third Street, a few days ago showed to good advantage among other brighter blossoms. It lacks the substance of Baroness Rothschild, from which it is a sport, and it is not so full as the flower of the parent plant, but for this very reason it is more delicate, and its pure or flesh-white cup-shaped flowers have a peculiar grace. The foliage is a singularly bright and cheerful green. In the same window was a specimen *Acacia cultrifolia*. Its spikes of flowers, near the end of the branches, stand out in large numbers, making a thyrs-like mass of deep yellow in beautiful contrast with the silvery foliage. These glaucous leaves along the stem resemble scales, and are set on in the peculiar edgewise fashion which gives the plant a marked appearance.

Mr. George H. Hazzard, Commissioner of the Interstate Park of the Dalles of the St. Croix, has submitted his first report to the Governor, and with it a pamphlet of a hundred pages containing much useful matter about this most interesting state reservation. When the park is extended so as to include the lower Dalles, as it in all probability will be, it will extend along three and a half miles of shore-line on the St. Croix. The tract is unique in the variety of its geological features, rich in forms of plant-life, and its scenery is remarkable for wild and picturesque features. In speaking of the advantages of public recreation-grounds for people in the country as well as in the city, the Superintendent states that a Grange in Ohio has recently bought a tract of woodland on the banks of a beautiful stream for a park, while a few miles above The Dalles, on Wolf Creek, the farmers have bought a fine grove where they have erected some shelters and other conveniences for holding Fourth of July celebrations, harvest homes and picnics.

Glacé fruits are among the most attractive and satisfactory of the varied offerings of first class fruit stores. They come from France in paper boxes, each containing a quarter, a half, or a full pound of inviting preparations, and also in one, two, four and six pound wooden boxes. Some of the larger packages are filled with only one kind of fruit, but these and the smaller ones, with assorted fruits neatly arranged in rows of one kind, are beautiful and make easy buyers of inspecting customers. A two-pound box, for exam-

ple, holds nearly four dozen fruits in seven rows separated by dainty white lace paper. There are small white pears, tiny limes, alternating yellow and green, large apricots, deep and rich in color, green gages, a showy line of rose-colored pears, one of delicious-looking figs, and by way of novelty and variety, English walnuts, thickly encased in a candied covering. Other combinations are made from meaty cherries, with sweet Bigarreau and the sour fruit to choose from, some arranged with straw stems for convenient handling; peaches, fresh-looking slices of pineapple, some white and others a wholesome rose-color from being dipped in natural fruit-syrup; red and white strawberries; melons, the seeds removed and the whole form retained; mirabelles, small yellow plums; young green almonds, prepared with the outer and inner shell, the kernel being hardly formed, and slices of oranges. The colors, which are very distinct, make striking contrasts. These colors are always the natural tints of the fruits themselves, or in some instances of the bright juices of other fruits. Limes, which come green and yellow, are the unripe and the ripened fruits. The prices range from fifty to eighty cents a pound. Turkish fig-paste—some white and some pink—is a generally esteemed fruit confection, and apricot paste is more rarely seen. In another class are the candied orange, lemon and Sicily citron, seen in grocers' stocks, and glacé Angelique, or stalks of rhubarb, which are used in confectionery. For several years past a high grade of glacé fruits from California have been sold in eastern cities, including figs, plums, cherries and other sorts. Crystallized ginger is, perhaps, the best known of all these confections, and Brazil nuts and other imported and native nuts are largely used in candied coverings, while fruit bars are popular. Among the most costly delicacies are candied rose petals at \$1.50 and violets at \$2.50 a pound. Many of the fruits also come crystallized, or with an additional coating of granules of sugar.

As we go to press the announcement is made that President Cleveland has set apart by proclamation thirteen new forest reserves, including altogether an area of more than twenty-one million acres. This, added to the reservations previously established by Presidents Harrison and Cleveland, increases the total area of reserved forest land in the western states and territories to about thirty-nine million acres—that is, the combined area of these reservations, exclusive of the National Parks, is as great as that of the states of Maine, New Hampshire, Vermont, Massachusetts and Rhode Island. The new reserves include all the central portion of the Black Hills of South Dakota, the Big Horn Mountain Range in Wyoming, the Jackson Lake country south of the Yellowstone National Park in Wyoming, all the Rocky Mountains of northern Montana, a valuable forest region in northern Idaho, the principal part of the Bitter Root Mountain region in Montana and Idaho, the Cascade Mountains of northern and of southern Washington, the Olympic Mountain region in north-western Washington, the Sierra summits of California north of the Yosemite National Park, the San Jacinto Mountains in southern California, and the Uintah Mountains in northern Utah. The location and boundaries of these forest lands have been carefully studied by the commission appointed by the National Academy of Sciences, who have made it their aim to include as much as possible of the great bodies of timber that are left on unentered land, and wherever it was practicable to secure the continued existence of the forests on high mountain slopes which protect the sources of streams most useful for irrigation and navigation. Much remains to be done before this magnificent domain is rendered safe from spoliation, but the simple act of setting these forest lands apart is enough to justify the creation of the commission. In our next issue we shall publish with some fullness of detail a description of the reservations, and we only add here that it may be doubted whether any act of President Cleveland's administration will have such a beneficent and far-reaching influence upon the welfare of the country as this series of proclamations. The country is to be congratulated on having a Chief Magistrate who is capable of taking such a broad and statesmanlike view, and the people will be grateful to him for the promptness and decision with which he has acted.

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The New Forest Reserves.

WE announced in our last week's issue that President Cleveland had signalized the close of his administration by taking an important step toward solving the difficulties of forest preservation on the public domain of the United States. On the 22d of February he added thirteen new reserves to those already established, so that, exclusive of the national parks, the forest reservations in our western states and territories, taken together, will now cover an area sixty miles wide and more than one thousand miles in length. To the general summary we have already published regarding the location of these priceless tracts, we now add a more detailed description of each reserve.

The Black Hills reserve has an estimated area of 967,680 acres. The mountains are here covered with forests of Yellow Pine, and in the valleys between them Spruces and Cottonwoods principally occupy the ground. Special value is attached to these forests, as they contain the only timber which is produced in the territory between Minnesota on the east and the Big Horn Mountains of Wyoming and the Rocky Mountains on the west. They supply the material for a number of important mines and afford the only local timber and fuel supply for the settlers residing in the valleys of streams flowing from these mountains. The whole Black Hill region has suffered seriously from fire and the illegal cutting of timber, and for years the mines in this region have been practically supplied with timber and fuel taken without authority from the public domain.

The Big Horn reserve has an estimated area of 1,198,080 acres, and embraces both slopes of this high, isolated and exceedingly broken range of mountains, which contains a number of peaks varying from 9,000 to 11,000 feet in altitude, and the sources of many streams needed for irrigation. The forests here are composed of Pines and Spruces of small size; they contain, however, material to supply the local demands of agriculture and mining, although timber probably will never be shipped from them. They are most valuable in the protection they afford the sources of streams capable of irrigating a large territory which, without irrigation, can produce only scant and uncertain pasturage.

These Big Horn forests have already suffered severely from fire, and unless they can be protected the irrigating capacity of the Big Horn streams and the value of many of the valleys of central Wyoming for agriculture will be destroyed.

The Teton Forest Reserve embraces 929,448 acres, and is south of and adjacent to the Yellowstone Park Timberland Reserve. The forests which cover it are similar in character to those in the Yellowstone National Park, and, although they have no great commercial value, are capable of supplying any local demands that will probably ever be made on them. This reserve contains the Teton range of mountains, Jackson Lake and some of the grandest and most picturesque scenery of the Rocky Mountains. Many streams flow from this reserve, and as a reservoir of moisture it is of great value. Here, too, is a favorite home of the elk and other large game, and as a game preserve it will well supplement the Yellowstone National Park and the Yellowstone Park Timberland Reserve previously established.

Two reserves are made in northern Montana; the first, the Flat Head Reserve, embraces both slopes of the main Rocky Mountain range or continental divide, and extends from a point near the line of the Great Northern Railroad northward to the international boundary. It has an estimated area of 1,382,400 acres, and contains within its boundaries several high glacier-covered peaks, numerous lakes, the sources of important streams, and, perhaps, the most sublime mountain scenery in the United States. That part of this reserve which lies east of the continental divide holds the sources of many tributaries of the Missouri and of the Saskatchewan, dependent entirely for their water on the snow which falls on these mountains, and is protected by their forests of Pine and Spruce. In this reserve west of the continental divide are the great north fork of Flat Head River and many smaller tributaries of that stream. The forests here, under the influence of a more humid climate, are heavier than those on the eastern slopes of the continental divide, and are composed of Spruces, Firs, Tamaracks, Cedars and Cottonwoods, which often grow to a large size, and which in time can be made valuable in the development of Montana and its industries.

The second reserve in northern Montana extends southward from the line of the Great Northern Railroad nearly to the forty-seventh degree of north latitude, and has an estimated area of 2,926,080 acres. It embraces an exceedingly rough mountainous territory watered east of the continental divide by the north fork of Sun River and west of the divide by the south fork of the Flat Head River and by Swan River, a large tributary of Flat Head Lake. The forests in their general features and value resemble those in the Flat Head Reserve. It contains no agricultural or grazing land and no evidence of valuable mineral deposits, and no entries of land have been made within its borders. The forests on this reserve are valuable east of the continental divide for protecting the supply of water in certain important tributaries of the Missouri; west of the continental divide for the great stores of timber which they contain.

The Priest River Reserve occupies the basin of Priest Lake and Priest River, in the extreme northern part of Idaho and north-eastern Washington, and extends from a point a few miles north of the Great Northern Railroad to the international boundary, covering the basins of all the streams flowing into Priest Lake and Priest River. It has an estimated area of 645,120 acres, and is clothed with what is believed to be the most valuable body of timber in the interior of the continent. This is largely composed of the western White Pine, *Pinus monticola*, which grows here to its largest size and greatest perfection, Tamarack, Cedar and Spruce, all of large size. This reserve has been made in order that this body of timber may be preserved until it is actually needed by the country and that the Government may obtain from it its true market value.

The Bitter Root Forest Reserve includes a forest region of extremely precipitous and rugged mountains on both sides of the boundary between Montana and Idaho, and covers an estimated area of 4,147,200 acres, being the largest of all the new reserves. East of the summit of the Bitter Root Mountains it contains the sources of all the western tributaries of the Bitter Root River, which waters the broad valley of that name and finally falls into the Columbia. West of the summits of the Bitter Root Mountains the reserve includes some of the tributaries of the Clearwater River and many of the tributaries of Salmon River; it protects, therefore, the sources of streams which can be used advantageously for purposes of irrigation, while the whole is clothed with forests of Yellow Pine, Lodge Pole Pine, Spruce, Fir and Cedar. The forests in this reserve have often suffered from serious fires, many of them probably more than a century old, but no lumbering has been done west of the Bitter Root Mountains, and the whole region is rough and broken. It has no value for grazing except over a few small scattered areas, and no considerable deposits of valuable minerals. The forests in this reserve will be able to supply a large amount of material to the inhabitants of eastern Oregon and Washington, which is now one of the richest wheat-producing regions of the United States, and to the people of treeless southern Idaho. This reserve is probably the largest unsettled region in the United States, there being within its boundaries but three quarter sections of land entered in Idaho, while no land has been entered in Montana. Few persons pass over its rough and difficult trail, and it can, therefore, be easily protected from fire.

The Washington Forest Reserve extends in Washington from about the one hundred and twentieth degree of west longitude to nearly the one hundred and twenty-second degree, and from the International Boundary southward to a little below the forty-eighth degree of latitude. It extends over both slopes of the Cascade Mountains, and is broken and entirely clothed with forests. Within this reserve, east of the Cascade summits, are the sources of large rivers, important for the irrigation of a region which needs only water to become exceptionally fertile. West of the Cascade summits are some of the heaviest forests on the continent composed of Spruces, Firs, Pines, Cedars and Hemlocks of the first commercial value. Mount Baker, the most northern of the large volcanic peaks of Washington, is situated in the western part of the reserve; it contains 3,594,240 acres.

The Olympic Forest Reserve occupies the high and broken Olympic Mountain region in north-western Washington and contains an estimated area of 2,188,800 acres. This is a country of steep and rugged mountains, their highest peaks clothed with glaciers and with perpetual snow. The forests here are watered by more copious rains than fall in any other part of the United States, and are composed of enormous Spruces, Firs and Cedars. In productiveness the Olympic forests are surpassed in the world only by the Redwood forests of California. Few explorers have penetrated far into this region, which from the denseness of the vegetation offers exceptional difficulties to travel, and there is no record that it has been crossed in a north and south direction. This reserve is believed to contain the largest and most valuable body of timber belonging to the nation; and in no other part of the United States can the forest, uninjured by fire or the axe, be seen over great areas in all its primeval glory. There is no agricultural or grazing land whatever in this reserve, and no indications of precious metals have been found in it. Its forests can be made to yield permanently great quantities of timber, and its wildness, the picturesqueness of its surface and its remoteness make it one of the most valuable of all the forest reserves.

The Mount Ranier Forest Reserve is an enlargement of the old Pacific Forest Reserve, which is now carried southward along both slopes of the Cascade Mountains nearly

to the Columbia River, and is made to include a narrow strip west of the original reserve in order to include some of the chief glaciers of Mount Ranier. The name, too, is changed to that of the great mountain which is the chief natural feature of this reserve. The southern extension of this reserve protects the sources of many of the tributaries of the Yakima River, which furnishes the water for an important irrigating plant, and it will also preserve a vast amount of timber of first-rate commercial value.

The Stanislaus Forest Reserve contains 691,200 acres and lies along the summits of the Sierra Nevada Mountains in California, immediately north of the Yosemite National Park, which it joins. Many streams flowing east and west head in this territory and are fed by numerous small lakes and alpine meadows. The forests, except in a few townships, are scattered and without value beyond their influence on the flow of springs and streams. This region has long suffered from the illegal pasturing of sheep and by the fires which always follow the shepherd through the forests on the public domain, and, unless its natural features can be preserved, its value as a water-storage basin will be seriously impaired.

The San Jacinto Forest Reserve embraces the San Jacinto Mountains in southern California and contains an area of 737,280 acres. This is an arid region, the lower slopes of the mountains being clothed only with a bushy chaparral growth. Scanty forests of stunted conifers, however, exist on the sides of some of the cañons facing the ocean and cover the high valleys and elevated slopes, and the preservation of these forests will maintain the supply of water needed to irrigate the valleys of south-western California. These valleys before water is poured on them are deserts, but with the aid of water they can be covered with prolific orchards.

The Uintah Forest Reserve embraces most of the Uintah Mountain Range in northern Utah, and contains valuable forests of Spruce which protect the sources of several large streams, several of which are already utilized for irrigation. The region within the reserve is uninhabited, but there is already a large agricultural population living in the territory immediately adjacent to it, and this population will suffer for water and for a local timber-supply if the fires which have now for many years swept through these forests are allowed to destroy them.

The establishment of these reserves is the first achievement of the Commission of the National Academy appointed last year by Professor Wolcott Gibbs, the President of the Academy, at the request of Secretary Hoke Smith. The Commission during the past summer has examined the general features of the territory now reserved, and the requirements, present and future, of the people living near these forests; it has laid down their boundaries, and it is upon its recommendation that they have been made. The creation of such a Commission appears, therefore, to have been justified; its duties, however, are by no means completed, and it now remains for it to prepare a scheme by which the thirty-nine million acres of mountain forests can be protected from illegal inroad, and can be profitably managed for the benefit of the whole people of the United States. Under existing laws no one can legally enter the reserves, obtain from them any forest supplies, or carry on mining operations within their borders. Such a state of things, of course, cannot be allowed to exist, and, unless these forests can be made to play the part which national forests play in all other civilized countries, the reserves must sooner or later be given up and their forests allowed to perish by unrestrained pasturage, fire and unwise cutting. Great as is the service already performed by the National Academy through this Commission, the task still left to it in organizing a permanent forest service and securing its adoption by Congress is infinitely greater and more difficult.

IN an act which has just passed both Houses of Congress it is provided that any person who shall willfully set fire to any timber, brush or grass on the public domain, or shall allow such fire to burn unattended near inflammable material, shall be guilty of misdemeanor under the laws of the United States, for which he can be fined not more than \$5,000 or be imprisoned for not more than two years, upon conviction in the local district court of the United States. Section 2 provides that all persons who build camp-fires or any other fires near timber or other inflammable material on the public domain shall totally extinguish them before they break camp, and the failure to do this will also be a misdemeanor subject to fine or imprisonment, or both, upon conviction in a court of the United States. With a view to encourage prosecution under this act it is provided that the fines collected shall be paid into the Public School Fund of the county where the offense is committed. It is not probable that this law will at once be enforced with any great rigor or vigor, but it is an admirable thing to have on the statute book, for as public opinion becomes educated, and especially as the people in the neighborhood of our great western forests begin to appreciate their value as they ought, this law will have behind it an energy of popular approval which will effectually enforce it. When the great Teak forests of India first came under the control of the British Government every one felt at liberty to despoil and burn them, but now the people who live in these forests are their staunchest defenders, and there is no doubt that a few years hence the people who visit our great western forests as tourists for pleasure, and the people who spend their lives near them, will all unite in cherishing them as among the most useful and beautiful of our national possessions.

The Chemise World.—II.

MANY northerly slopes in the Chemise region would be in open woods but for the recurring brush fires. It is a repetition of the conditions in the prairie states, where the grass fires kept trees from getting out of the scrub state. Nearly all the bushes in the Chemise region have great vitality and sprout vigorously after each burning. Sometimes a longer period than usual elapses between fires, and the heavy brush on the north hillsides has time to go through the thinning process. First, the Chemise, then the *Ceanothus* die out, and the weaker sprouts give up the battle. The next fire finds an open wood of low trees with insufficient fuel to make a fire to scald the bark of the vigorous saplings, but it clears the debris and makes them safe for the future. Douglas Spruce may come in, and Maples. The soil is strong, and moisture enough is present, and the trees attain a good size. On ranges where fires are kept out, this procession from chapparal to small timber is going on rapidly. Conifers are not so fortunate in the battle. Douglas Spruce is found throughout the Chemise region in scattering trees or small groves, usually on rugged hillsides close to watercourses. The thin bark of young trees of the Douglas Spruce makes it as susceptible to fire as the Pines, and the few now living are survivors. On large trees the bark is thick. These sometimes withstand many conflagrations, but at last succumb to an unusually hot fire, and, falling, expose their neighbors, until the little grove is wiped out. Nature has always kept these great slopes well clothed with a variety of trees. In twenty years, with a moderate chance, much of the brush land would be covered with timber of constantly increasing value. The white man is not the only offender, and the Indian for many years had fired the brush periodically.

The problem of the future forester is simple here; he need only keep out the fires, and a forest would soon be established. The soil is richer, in many places covered with heavy brush, than in the present woodland. The thinner growth on poor lands was spared by fire, while the rank growth on rich lands invited the flames. Species

which in some localities develop into grand trees, in others are found in the form of low brush. This is accounted for in some instances by poverty of soil; in others, aridity or altitudes are the causes. But, in nine cases out of ten, the dense copse is formed of sprouts from great charred stumps. These have ample vitality, if left alone, to send the sprouts up into trees, and with nature's thinning they would make stately specimens. The young trees, not so slender as when growing in a dense forest, reach upward for the light, and are well clothed and symmetrical.

Castanopsis chrysophylla, the Chestnut Oak or Western Chinquapin, is often found in dense copses in the higher portion of the range east of Ukiah. In the Chemise region it is seldom over five feet in height and fruits at that size. The burr is not unlike that of the eastern Chestnut, the nut small and thick-shelled. Just across the valley to the west it again occurs in the dense chapparal growth, and between the periodical brush fires reaches a height of from twenty to forty feet. It is, however, in the Redwood region that it is to be seen at its best. On the high ridges in the Redwoods it often grows from eighty to one hundred and twenty-five feet high, straight as a Pine, and branchless for two-thirds its height, with a magnificent full head. Such a monarch of the woods stands near the public road a few miles above Willets, in this county, and was visited and described by that pioneer botanist, the late Dr. Kellogg, who considered it the king of its kind. The name *chrysophylla* is due to the yellow powder underneath the leaves. In a breeze the leaves alternately present a dark green and golden side with a beautiful effect. The Chestnut Oak follows the Coast Range from Monterey into Oregon.

Another tree which is common in a shrubby form in the high Chemise region is the California Live Oak, *Quercus chrysolepis*. I will reserve for a future time a description of it as it grows at its best. It is common as a large bush or low tree on the north hillsides, while on some gravelly hill-slopes it forms a dense low growth. All of these shrubby or low-growing forms have leaves as green and prickly as an English Holly, while on old trees the leaves are entire.

Quercus Douglasii is common in the Chemise region in the drier places. The California Black Oak, *Q. Californica*, is, however, the most widely distributed tree in this region. Little clumps of it are seen everywhere, and on all shaded hillsides its beautiful green foliage is conspicuous; many groves of it have reached the size where they are in less danger from fire. The common Scrub Oak here is *Q. dumosa*, var. *bullata*, which seldom exceeds twenty feet in height. Madroña, too, is common, but does not often reach the fruiting stage. Madroña, *Arbutus Menziesii*, has a very smooth, glossy brown bark, which is shed annually. This tree grows rapidly and sprouts freely, but naturally suffers more from fire than almost any other tree.

Ukiah, Calif.

Carl Purdy.

The Arrangement of Flowers.—I.

SHORT-STEMMED FLOWERS.

THE many short-stemmed flowers in our gardens are difficult to arrange satisfactorily for decoration. After many efforts I began to use small and shallow dishes, and flower arrangements became a new pleasure and delight. In six small crescent-shaped glass dishes known years ago as "bone" plates, a layer of wet spongy moss is placed, and they are filled with water. In an early morning visit to the garden I gather into a large, round, flat basket, that probably was originally some Japanese farmer's shade, great velvety pansies that need to be picked to keep the plants blooming through the summer. The plants in one bed of Sweet Alyssum, *Alyssum maritimum*, flower so low that the little, thick, white heads are hardly three inches high, and these I cut off close to the ground. These little stemless flowers have an unpromising look, but the saucers and moss provide a suitable setting. If the dining-table is long the dishes are placed end to end the

length of the table, making an irregular rope effect. Sometimes I commence at the centre to arrange the pansies, and all the dark blue and purple flowers are selected. These are placed in the moss, some high, others low, some turning one way and some another, the outside of the little crescent relieved by the Sweet Alyssum, and so on down the length of the table, with lighter pansies in the next dish, and still lighter ones beyond, until the lavender and pale yellow and white pansies finish the ends of the rope of flowers. Generally, flowers that bloom in different colors, as the Corn-flower, *Centaurea Cyanus*, are more effective when the colors are separated and one or two shades only are arranged together, but I think pansies are an exception, and all their colors seem to harmonize. Nevertheless, the effect is much heightened by tasteful combination. A careful study of the way the pansies look on the plants will help to avoid any stiff effect in their arrangement, and the combination with Sweet Alyssum makes a beautiful table decoration. Heliotrope may be used with pansies, or Maiden-hair Fern, or small clippings of their own bright green leaves, always avoiding a regular arrangement of first a flower and then a leaf. Nearly half of a dish may be solidly filled with Maiden-hair, and the eye turns with delight from the mass of quiet green to the gorgeous coloring of the pansies. An especially fine blossom should be prominently displayed or surrounded with colors that best bring out its beauty.

These same dishes lend themselves to many other pleasing effects. I sometimes place them point to point to form a circle, and in the centre a tall slender vase with a few white roses or other flowers of quiet coloring that do not spoil the effect of the pansies. For a large table an ample platter of flowers may be arranged in the centre, and the small dishes extended down the table from it; or one low dish filled with moss and flowers and edged with Ferns or some different flower is effective. The pronounced pansy clusters may be softened with the foliage of the common garden Carrot, the delicate leaves falling around the edge of the platter like a lovely ruffle of lace. If the flowers are watered each day they will keep fresh for a long time.

Besides the crescent saucers a number of other low dishes may be easily procured, such as cheap pressed glass olive and bonbon dishes, all shallow enough to be filled with moss, and the shapes are often quite artistic. Soup dishes, fish platters and bread plates were frequently pressed into this service until the housekeeper maintained her rights in the pantry, and I have been forced to get the pressed glass. After all, there is nothing more satisfactory than glass for flowers; it requires extra care, but a package of washing powder will keep it looking bright with little trouble.

If desirable moss does not grow as near a garden as it does to mine it may readily be had from a florist, and it can be kept moist in a tin box, and the same moss used several times. Pansies have been suggested as the principal example of short-stemmed flowers, but many others will show to the best advantage arranged in this way, as the sweetbrier rose, the fragrant cinnamon rose, forget-me-nots, violets and nasturtiums.

Rangeley, Me.

Dorothy Root.

Foreign Correspondence.

London Letter.

THE annual general meeting of the Royal Horticultural Society was held at Westminster on February 9th. A large number of Fellows were present, and the proceedings were of an unusually smooth and satisfactory character. The President, Sir Trevor Lawrence, called attention to the amount of useful work done by the Society during the year, and to the absence of evidences of dissatisfaction among Fellows and friends of the Society. The balance-sheet showed that about four thousand pounds now stand to the credit of the Society, a state of things which proved the wisdom of the new departure made ten years ago when

the Society, at that time deeply in debt, quitted South Kensington and decided to devote itself to horticulture exclusively, instead of combining it with brass bands, fireworks and tea-gardens.

The experimental gardens at Chiswick are being gradually remodeled and the keep and collections of the Society's garden made worthy of the headquarters of English horticulture. Dr. Masters expressed a hope that efforts would be made to keep Chiswick to the fore by holding now and then exhibitions or formal meetings of some kind to bring the Fellows and friends of the Society there. Professor Michael Forster remarked that the Society had not got to the extent of its usefulness and there is a strong feeling in some quarters that good experimental work done on scientific lines might be undertaken at Chiswick with beneficial results to horticulture. The Society must have a garden, and, moreover, one that will always do creditable work in the interests of scientific horticulture. The annual cost of these gardens to the Society is about £2,000. Mr. Barron's successor, Mr. Wright, was accorded high praise by the President for the work he had done since he took charge at Chiswick.

The bimonthly meetings and exhibitions held in the hall continue to attract large numbers of those interested in horticulture, owing to the fact that every plant with any pretensions to rarity or exceptional beauty, and even examples of cultural skill, is sent to these meetings for certificate or commendation. During last year eighty-four first-class certificates were awarded, principally to plants, and three hundred and fifty awards of merit. The Council consider this number excessive and recommend that the committees should be more careful in selecting. There is no good reason for granting certificates to old favorites, as is sometimes done now, solely on the ground that they have never had such recognition, otherwise I do not remember that any plant distinguished by a certificate last year was unworthy of it. Sixty cultural commendations were voted to plants showing extra cultural skill, over half of these being Orchids.

It has been felt that the record of the plants certificated was incomplete without an accurate drawing or picture representing the essential characters of each. To remedy this defect a move has been initiated by the Orchid Committee, certain members of which undertake to pay a third of the expense, by which all the Orchids certificated will in future have their portraits painted by a competent artist. A suggestion was made that this should be done for all plants certificated, and it is probable that this will soon follow, should the pictures of the Orchids prove a success. As a rule our horticultural journals are energetic in preparing and publishing drawings of all meritorious new plants exhibited, but these are not always of such a character as to enable one to make critical comparisons. After all, *The Botanical Magazine* has been and continues to be the portrait gallery of all good and interesting species of plants introduced into cultivation, and it is only the varieties and forms of garden origin for which some similar arrangement now requires to be made. Competent pictures of these will have a value to the student of racial development among garden plants now and in the future, a subject of quite exceptional interest to botanists at the present time.

In January, 1893, the Council published a list of all the plants, flowers, fruits and vegetables certificated from the year 1859 to 1892. A supplement is now ready, bringing the list down to December, 1896. Each part is issued at the price of one shilling, but the two together may be obtained for eighteenpence, at the Society's office.

An examination in the principles and practice of horticulture was held on May 1st, concurrently in different parts of the United Kingdom, a centre being established wherever a magistrate, or clergyman, or schoolmaster, or other responsible person accustomed to examinations would consent to superintend one on the Society's behalf and in accordance with the rules laid down for its conduct. No limit as to the age, position, or previous

training of the candidates was imposed, and the examination was open to both sexes. One hundred and fifty-two candidates presented themselves for examination. The names and addresses of those who succeeded in satisfying the examiners, together with the number of marks assigned

English history. Some of these proposals were for one reason or another found to be impracticable, others were found to involve a far larger expenditure of money than the Society can command or could reasonably hope in so short a period to collect. They have, therefore, after most



Fig. 11.—*Pyrus occidentalis*.—See page 86.

1. A flowering branch, natural size. 2. Vertical section of a flower, enlarged. 3. A fruiting branch, natural size. 4. Cross-section of a fruit, enlarged.

to each, will be found in the Society's *Journal*, vol. xx., part 1, 1896, page 58.

The Council have had before them various proposals for celebrating the attainment, by Her Most Gracious Majesty the Queen, patron of the Society, of the longest reign in

careful consideration decided, with Her Majesty's gracious permission, (1) to strike a special medal or medallion, to be called the Victoria Medal of Horticulture, and to be awarded honoris causa in the domain of horticulture. They will also (2) join in the celebration of the event which is to

take place at the great show to be held at Shrewsbury in August, to which they have received a very cordial invitation.

This novel proposal was passed over without comment at the meeting, but there are indications of uneasiness as to how these medals will be distributed so as to avoid creating ill-feeling.

A proposal to institute an "arbor day" in the interests of the cider industry was submitted to the meeting, but met with no encouragement, the feeling being that the subject belonged rather to the domain of agriculture. At the same time there is much to be said in favor of a united effort to renovate our orchards by the removal of old worthless varieties of fruit-trees, particularly Apples, and substituting better sorts. There are thousands of acres occupied with trees that cannot be of the slightest value in these days of an easy supply of good fruit from foreign sources. There is a difficulty, however, in the fact that many of the proprietors of these "wasted orchards" are too poor to afford the cost of renovation. During last month nearly £300,000 worth of apples were imported into England. The first installment of peaches from the Cape last week, and 100,000 cases of apples, are announced to arrive from Tasmania in April and May next.

There is always an interesting display of plants at this meeting, and that of last Tuesday was particularly so. Orchids were numerous, and among them were several new hybrids of distinct merit, namely, *Lælio-Cattleya violetta*, a hybrid between *L. purpurata* and *C. Gaskelliana* (Veitch); *Phalænopsis Hebe*, a hybrid between *P. rosea* and *P. Sanderiana* (Veitch); *Phajo-Calanthe Brandtiae*, a hybrid between *P. Assamicus* and *C. Veitchii* (Sander); *Cypripedium Enid*, a hybrid between *C. bellatulum* and *C. Spicerianum* (W. Rothschild); *C. Rolfei*, said to be a hybrid between *C. bellatulum* and *C. Rothschildianum*, but considered by the committee to be between the former and *C. insigne* (Statter); *Dendrobium Burberryanum*, a hybrid between *D. Dominianum* and *D. Findlayanum* (J. Chamberlain). There were also some magnificent specimens of *Dendrobium* from Messrs. Cypher, of Cheltenham, and a beautiful example of the rare *D. subclausum*, with bright orange-scarlet flowers, was shown by Messrs. Veitch.

London.

W. Watson.

New or Little-known Plants.

Pyrus occidentalis.

THIS little alpine Mountain Ash is the best marked of the whole group in the deep blue-green color of its leaves and its dwarf habit, as I had good opportunity to observe last summer in a journey which carried me through many of the forest regions of the western states and territories, where I met with this shrub in Washington, near the summit of the Cascade Mountains at the point where they are crossed by the line of the Great Northern Railway at an altitude of 3,400 feet, near the timber-line of Mount Ranier at 6,000 feet altitude, at 5,000 feet altitude at the timber-line on the ridge south of the Solduc River in the Olympic Mountain region, and in Oregon near the timber-line on the north slope of Mount Hood.

Pyrus occidentalis (see illustration on page 85 of this issue) where I have seen it is a shrub with many stems from eighteen inches to two and a half feet high, forming broad, symmetrical compact clumps, and during their first season puberulous or even hirsute, and with large, broadly ovate pubescent winter buds. The leaves vary from two inches to nearly eight inches in length, with slender hairy stems, and three, four or five pairs of lateral leaflets; these are short-stalked, oblong-elliptical or oblong-obovate, entire below, serrate only toward the rounded apex with a few coarse mucronate teeth; they are from one to two inches in length and from one-third of an inch to nearly an inch in width, deep blue-green on both surfaces, but deeper on the upper surface than on the lower. In the early autumn

the leaves turn bright scarlet. The flower-clusters are from one inch to two inches across, and the expanded flowers are about a quarter of an inch in diameter; they are quite glabrous, with the exception of a few short hairs on the acute, nearly triangular calyx-lobes, and of the conspicuous masses of long, slender white hairs which cover the ovary. The fruit is subglobose, rarely more than a quarter of an inch long and bright orange-red, with short and comparatively broad seeds narrowed at the ends, and nearly semicircular in outline.

At the high altitudes* where I have only seen this plant, it remains buried in snow until the beginning of August, and then, as the snow melts, bursts suddenly into full vegetation. So short here is the period of growth that the side of one of these shrubs when it is growing against a cliff may have flowered and begun to set its fruit while the branches on the other side, owing to their covering of snow, are still leafless.

Sereno Watson, who first distinguished *Pyrus occidentalis*,† refers to it the shrubby Mountain Ash of the high California Sierras, but this plant differs from the Cascade shrub in its greater height and more open, tree-like habit, in its glabrous branches, buds and leaves, in its dark green, not blue-green, leaflets, which are serrate below the middle, and frequently nearly to the base, and in its larger flowers and fruit and proportionately much narrower seeds. Although this Sierra plant differs from other forms of the second species of Mountain Ash of western America in its shorter leaflets, it is probably only an alpine form of that widely dispersed and very variable plant which has always been referred to *Pyrus sambucifolia* of Kamchatka, but is evidently quite distinct from that species.

I was fortunate in obtaining a few ripe seeds of *Pyrus occidentalis*, and these have been planted in the Arnold Arboretum and distributed among a few European gardens in the hope that this pretty and distinct shrub may be added to the list of garden plants.

C. S. S.

Cultural Department.

Daffodils for Pot Culture.

IT is strange, since bulbous plants are so generally used for forcing, that the Daffodils, the best of them all, should be almost utterly neglected as subjects for pot culture. It is true that within recent years the old double yellow Daffodil, which the trade calls Von Sion, has become popular, and is forced in quantities for the cut-flower market, but it is only a poor representative of the varied beauty, both of form and color, displayed by this wonderful family. This old double form is distinctly a plebeian strain and lacks the general grace of the family, and, as yet, I find that there are not a few intelligent persons who are acquainted with no other Daffodil. Hyacinths and Tulips are flowered in pots in every greenhouse, and perhaps the only reason why Daffodils are not used in this way is that we get into ruts and, apart from the old double Von Sion, we leave Daffodils alone with a possible exception in the case of the overwhelmingly odorous Jonquils or the Paper-white Tazetta forms. Daffodils are more often forced in England than they are here, but there is a stronger reason for growing them in pots in this country. In an average English season the Tenby Daffodil begins to show flowers in the third week of February in the open ground, and thenceforward throughout the long and gradually opening spring a succession of Daffodils can be maintained until the Poet's Narcissus fades in June. In this country, as a rule, no flowers of any size break through the frosty ground before March is more than half gone, and last year it was mid-April before the spring flowers were awakened, and then the sudden appearance of August weather soon dried them up. There is, therefore, much more reason in this country for protracting the spring flower season than there is in England, and for this the Daffodils are the very best pot-plants that can be used, for by making selections from different sections of this large family we can have a season which lasts through months.

* Specimens of a plant which appears identical with *Pyrus occidentalis* were collected by Funston in 1891 on the shores of Disenchantment Bay, Alaska, and this species may be expected to range southward along the coast mountains of British Columbia.

† Watson, *Proc. Am. Acad.*, xxiii., 263 (excl. hab. Cal.) (1888).

Taking the Trumpet Daffodils first, we had in January Henry Irving and Golden Spur in flower, the first one a bold, rich yellow, shaped like the Tenby Daffodil, but altogether larger; the other larger still, but lighter in shade and exquisitely beautiful in form. Following these came Maximus, which is now out of flower, the richest in color of them all, magnificent in proportions, with its trumpet finely frilled. Emperor is now opening and Horsfieldii will follow it soon, and both these are of regal beauty and show to the very best of advantage in pots. Horsfieldii is well known as among the noblest of the bicolor group, with its pure white perianth and yellow crown. Then come the Star Daffodils with their tiny chalices in the centre of broad, spreading saucer. This large and variable section of the family is now represented by the lovely Barri conspicuus, its corona fringed with a margin of deep orange-red. A score of forms slightly varying from this type can be had, and every one of them is good. Mrs. Langtry is now in flower, the type of another section, the Albino, with flowers like a Eucharis in miniature. This variety, or the Duchess of Brabant, the Duchess of Westminster, Catherine Spurrel and one or two more once tried will never thereafter be neglected. The well-known Poet's type is another section, and the early kind known as Poeticus ornatus has already been in bloom, after which the later varieties will maintain the succession.

In short, there are a hundred varieties good enough and distinct enough to grow and flower in pots, and their cultivation is of the very simplest. Pot them up, four, five, six or more bulbs in a pot, according to size, during August or September, and stand them in any convenient spot. They need not necessarily be kept covered nor darkened, as they will fill the pots with roots in any case. Place the lot which is to flower first in a temperature of fifty-five to sixty degrees early in December and they will open during January, while by moving other batches in succession the display may be kept up for three or four months, and it never need be monotonous if a wise selection is made and every batch consists of a different variety. Last, but not least, after they have flowered the bulbs need not be wasted. By preserving their foliage they may be ripened off and planted outside in beds, borders or shrubbery groups, or in the grass, and naturalized if one has the room. Further, those who have to study economy in their purchases may use their bulbs for forcing again by giving them one season's rest, growing them in the open ground, so that with two lots of bulbs, one in pots and another outside, alternating, there is actually no need to make annual purchases, and, in fact, one's own stock will be found to increase considerably as time goes on.

Madison, N. J.

A. Herrington.

[Flowers of Emperor, Sir Watkin, Barri conspicuus and Mrs. Langtry, which accompanied these notes, were admirably grown.—Ed.]

Nægelia cinabarina.

GOOD flowers are always appreciated in the winter, and it is especially pleasant to meet a plant or group of plants that one was accustomed to see and grow in early years, but which have been lost to sight from various causes since. An agreeable experience of this kind occurred to me a few days ago when I entered a greenhouse and unexpectedly saw in full bloom a mass of this old *Nægelia*, known forty years ago as *Gesneria*. These were vigorous specimen plants in five-inch pots, about two feet high, with large cordate leaves and fine racemes of superbly colored flowers. The leaves of this variety are beautifully shaded with flame-colored hairs, giving them a velvety lustre, while the flowers, like small, drooping Gloxinias, are vermilion, with yellow throat irregularly marked with scarlet at the base of the limb, and borne in racemes.

Nægelias are exceedingly ornamental plants on account of their free-flowering qualities and also their beautifully marked foliage. For general decorative purposes, a pot-grown plant eighteen inches to two feet high, the foliage covered with a bright nap and numerous spikes of brilliant flowers, makes a unique table decoration. They ought always to be grown in quantity, however, so that the leaves can be cut for decorative combination with the flowers of *Allamanda*, for example, when they produce splendid effects. Although rarely seen now, *Nægelias* are of easy culture. One reason why they have fallen into obscurity is the general use, or misuse, of the garden hose. They are moisture-loving plants, as other Gesneriaceae are, but they resent having their leaves constantly wet. As the water-supply is too often from wells or the hydrant, it contains lime or other mineral matter in solution, and the sediment left among the minute hairs on the leaves

after frequent waterings gives them a rusty appearance, or at least, their brilliancy is gone, they are more or less stunted, and good flowers need not be expected. To maintain healthy and vigorous stock the plants must be fully developed, or they will get weaker and ultimately perish. Great care must be taken to preserve the foliage, and if water is known to contain lime, etc., the plants should not be watered overhead or syringed with it.

Nægelia plants may be had in bloom in succession, or at any desired period of the year. The stolons should be potted at different times from January to July in a soil of fibrous loam, peat and leaf-mold in equal parts, with a due proportion of sharp sand. The soil should not be sifted, but rubbed through a coarse screen to separate any rough pieces of roots, stones, etc. The pots should be clean and thoroughly drained. Any size may be used as may suit individual needs. The stolons may also be started in pots or seed-pans, using fine soil, and afterward be potted off singly, selecting the strongest plants for single pots and setting others three in a pot. These should be placed in a temperature of seventy-five degrees and watered sparingly until after growth has started. They should be near the glass to prevent "drawing," but need shading from the sun at all times. A warm, moist atmosphere is essential, and a dry air or a cutting wind is disastrous to them. In summer a batch may be grown in a frame or pit on a bed of cinder ashes, if properly shaded and ventilated, and when well established they should receive an occasional watering of weak liquid-manure. Plants in flower may be kept in a cool house, and an atmosphere not too humid at a temperature of sixty-five to seventy degrees, which will preserve and prolong the flowers in good condition. After the plants have finished flowering they should be preserved in a natural state until the leaves die down. Less water will be required at the roots, and in summer-time the plants may be placed in a frame outdoors, but must be kept shaded from the sun. When they have completed their growth they can be gradually dried off and the pots with their contents placed under the bench of a stove or other suitable place and kept dry, but care should be taken that they do not lie near the heating pipes, or the stolons will dry and shrivel up. The temperature should range between fifty-five and sixty degrees. In this condition they may remain until needed or until the time arrives for starting another lot. They can be propagated by increase of the stolons, or by cuttings of the shoots from mature leaves or seed. The leaves may be divided into sections or used whole as those of *Gloxinias* are treated, and if in the proper condition will at any time form stolons for the following season. The seed may be sown in same manner as *Gloxinia*.

Few, if any, insects affect these plants. As they start afresh in new soil and clean pots they make clean headway unless carelessly handled. Never introduce them into houses where thrips or mealy bug exist. Thrips will attack the plants and are troublesome to get rid of, as fumigating will be necessary, and this injures the plants. If mealy bug attacks them the safest remedy is clean water applied in a small stream very carefully from the hose until dislodged. A sure cure for mealy bug, and the least injury to the most delicate and tender foliage, is wood alcohol diluted with water. Take a small quantity in an ordinary cup and with a camel-hair pencil or small piece of sponge on the end of a stick for a holder dip in the alcohol and apply direct to the insect without wetting the entire plant. No brushing or rubbing is necessary, for this would be injurious. After the application the plants may be syringed carefully with soft or rain water. If this can be used during the growing season so much the better, as the plants are helped by occasional syringings with absolutely clean water without any lime in solution.

Riverton, N. J.

W. Tricker.

Greenhouse Work.

BY the beginning of February the sunshine becomes stronger and some shading should be provided for foliage plants. A variety of materials may be used, and in a large establishment this necessity involves a considerable expense. For a limited area of glass, especially on a private place where the greenhouses are often divided into a number of small compartments for different purposes, roller shades of thin cotton cloth, burlaps, or wooden slats are most satisfactory, and are especially useful on Orchid-houses, where at times it is desirable to give full light. On large greenhouses or where several houses are built together in a block it is not always practicable to use roller shades, and then the glass is usually painted on the outside. Lime-wash is the cheapest material for this purpose, but it is easily worn off by heavy spring rains; it also eats off the paint from the woodwork and injures the putty.

For a very light shading a mixture consisting of one pint of boiled linseed oil to one gallon of turpentine is quite satisfactory; it is easily applied with a large brush and withstands the weather. Naphtha and white lead, or kerosene and white lead, in proportions to suit, are used for this purpose on many large commercial places; these make a good shading in summer, but they do not withstand frost and snow. Linseed oil should never be mixed with this preparation unless a permanent paint is desired on the glass. Another preparation useful for shading is a cold-water paint known as Indurine; this withstands the weather much better than the lime-wash, and apparently does little injury to woodwork.

At this season the value of a slightly heated frame or pit is particularly evident, as much young stock is in preparation for outdoor planting to follow the crop of spring bulbous flowers. Such a frame need not be costly, and will do much to relieve the congested condition of the greenhouses and to obviate the use of unsightly shelves in them.

Young Carnations, Geraniums, Verbenas, Drummond Phlox and other annuals make a more sturdy growth in frames, and will be in better condition for planting out-of-doors.

Cuttings of Carnations may yet be put in, and a surplus of these plants in autumn will allow of more critical selection when the blooming stock is brought in again. Planting out the rooted cuttings of Carnations in flats or shallow boxes filled with good soil is not a new method, but it is a good one; it not only allows of their ready removal from one house to another, but the plants are less liable to become starved than those in small pots. Rose cuttings may also be made now, and if properly cared for will root quickly. Grafting the ordinary Tea Roses, such as are used for forcing, has again been discussed by some expert growers, and the opinion has been advanced that it is a paying operation. To say the least, it is interesting work, and even in the line of experiment it is worth a trial. The stock most highly recommended for this purpose is Manetti, and the experiment may be made now.

Mention was recently made of the sowing of Gloxinia seeds (see GARDEN AND FOREST, vol. x., page 27). When the seedlings are large enough they should be pricked out into small pots and shifted on into a larger size as soon as the roots come through the soil nicely, for if they are once stunted they do not soon recover. These plants require light rich soil, a rather moist atmosphere and moderate shade. Similar conditions apply to Tydæas, Achimenes and Eucodonias.

The best time for repotting Ferns is when the growth begins, and the young roots thus get the benefit of the new soil. Much of the old soil is removed in repotting, and the ball is much reduced. A reasonable after-treatment includes care in watering to avoid any extreme, and also a closer atmosphere until the growth is renewed.

Holmesburg, Pa.

W. H. Taplin.

Correspondence.

The Forests of Pennsylvania.

To the Editor of GARDEN AND FOREST:

SIR,—The state of Pennsylvania has attacked the forestry problem so seriously that I wish to invite attention to one or two points in the Report of the Commission which was editorially reviewed in your paper, vol. ix., page 521. It is a matter of some regret that Dr. Rothrock has not given more detailed information as to actual forest areas in the state and their condition, especially since the Commission covered into the state treasury more than \$5,000 of the sum appropriated to its use. It would seem that this money could not have been put to better or more legitimate use than in furnishing more accurate data on these points. Dr. Rothrock tells us that the present method of making forest area returns by the assessors is unpardonably bad, and yet this seems about the only source of information on this important topic of which he avails himself. The fire areas and the damage caused thereby was gained by circulars of inquiry from which the recorded returns are meagre and unsatisfactory. Nevertheless, the Report, as you have stated, is rich not only in fact but in suggestion, and is a notable addition to the popular literature of forestry, for it is the evident intention of Dr. Rothrock to enlist public interest not only in forest preservation but in all that pertains to trees.

It appears that 36.29 per cent. of the state area is in timber, but no estimate can be made of the value of this forest cover. "Much of what appears as timber land is not such in any productive sense. It may be producing Scrub Oak of no value or White Oak of great value." In Lackawanna and adjoining counties there "is an unproductive area of 970 square

miles which may be regarded more as a menace to the prosperity of the commonwealth than as an element of strength." So recently was this waste a lumber-producing area that in 1894 Dr. Rothrock counted thirty-six solid White Pine stumps still standing on an acre of ground. To-day, however, Yellow Pine from the south is being imported into the region for home construction. There is no development of mineral wealth, and the only possible function of the area is the production of timber, but it is a literal barren over which fires sweep every year, destroying the young growth and rendering the soil more and more sterile. Other regions of similar character are noted, and the forest crop removed thence is discussed, showing a constantly decreasing value in the timber output of the state, with a corresponding increase in waste areas. The figures quoted show conclusively that the White Pine, the most valuable of Pennsylvania trees, is practically exhausted. There have floated through the Williamsport boom, for the years mentioned, Pine and Hemlock logs as follows:

In 1875,	190,000,000	feet, b. m.,	.	.	White Pine.
" "	19,993,736	" "	.	.	Hemlock.
" 1884,	154,000,000	" "	.	.	White Pine.
" "	84,980,514	" "	.	.	Hemlock.
" 1893,	33,107,267	" "	.	.	White Pine.
" "	186,984,478	" "	.	.	Hemlock.

Dr. Rothrock is careful to explain that the increasing amounts of Hemlock do not indicate an inexhaustible supply, but, on the contrary, Hemlock too is approaching extinction.

The reduced value of the forest area is further illustrated by the lands advertised for tax sale, the amount being for 1894 1,500,000 acres. The Commission concludes that "between lands stripped of timber and worthless, and worn-out and unprofitable farm lands, Pennsylvania has at this hour not less than 8,716 square miles (about one-fifth the total area of the state) which have ceased to be an element of strength, and that this area is passing constantly into a worse condition." The state possesses practically no public lands, but the Commission, in discussing available areas for forest reserves, opposes the plan of using lands advertised for taxes, since their isolation renders their management too expensive, aside from the small size of such tracts.

The chapter on Timber and Fire as elements in the forestry problem is illustrated with a view of a volunteer crop of White Pine, thirty-five years old, standing in "The Barrens" of Center County, and this is conclusive evidence of the ability of this species to reproduce itself when protected from fire. As Dr. Rothrock well says, "planting alone goes for nothing in the absence of protection."

An examination of the final chapter of the Report, in which details regarding the forest area are given by counties, emphasizes the regret that the facts relating to this part of the Commission's work are so few. Nevertheless, data enough are given to show urgent need of a complete forest survey of the state, a work which will doubtless be undertaken in due time and for which Dr. Rothrock is peculiarly fitted.

Washington, D. C.

Charles A. Keffer.

The Keeping Qualities of Fruits.

To the Editor of GARDEN AND FOREST:

SIR,—One of my boyhood recollections is of a long-keeping apple which grew in an old orchard. There was an abundance of these apples in our cellar long after all the other varieties had disappeared. It was due to the fact that they were so sour not even a boy would eat them as long as any others remained. This variety was a beautiful-looking apple, very highly colored, of good size; the skin was thin, yet very firm and rather tough; the flesh was very white, tender and juicy, and if it had not been so decidedly acid the variety would have been a valuable one. A fruit must have something more than its keeping qualities to recommend it, otherwise it is soon consigned to oblivion.

It is one of the difficult problems of the fruit growers in the states south of Mason and Dixon's line to secure long-keeping varieties of apples adapted to the locality. It is a well-known fact that the late winter varieties of the north when grown in the south become autumn varieties. The Baldwin, for instance, when grown in the south matures early in autumn and will keep but a short time. It has often been said that Delaware is not adapted to apple-culture, but the fact that many varieties of fine apples are grown there is rapidly changing that opinion. It is very true that even northern-grown varieties are difficult to keep in prime condition in that climate. Never-

theless, there are several good long-keeping varieties which appear to be specially adapted to that locality.

The Jackson apple is a variety regarded very highly for its keeping qualities throughout the state. The tree is a prolific bearer, the fruit is of good size, the color is a dark purplish red on a green background. The skin is sufficiently tough and thick to make it a most excellent variety for handling. The color of the flesh is greenish white, and when in its prime, late in the season, it is tender, juicy and of excellent quality. The Lily of Kent, a native seedling, is an excellent variety with good keeping qualities. It is not as yet extensively disseminated in the state, but is rapidly growing in popularity. The old Winesap is a good keeper and bears very heavy crops. It is one of the best grown in Delaware. Stayman's Winesap bids fair to be valuable. In keeping qualities, productiveness and flavor it is superior to Winesap. The Roxbury Russet is a favorite variety in nearly all sections of the country on account of its good keeping qualities, and the Northern Spy, if carefully handled, can be had in its prime throughout March and April.

The keeping qualities of apples would be greatly enhanced if they were gathered as soon as fully grown and stored in a cool place. It is the custom with many fruit growers in Delaware to allow the apples to remain, without gathering, until a buyer is found for the crop, which is often long after the fruit should have been picked and stored. Recent experiments in spraying fruit give evidence that the keeping qualities are greatly improved by the use of fungicides.

Throughout Delaware the Kieffer pear is very largely grown, as it is one of the most profitable varieties. It is an excellent keeper, is a heavy bearer and makes a fine appearance. These pears are grown mostly for canning. When eaten out of hand they have little flavor, yet they sell well, and are among the most profitable of market fruits.

The firmness of the flesh of the strawberry greatly enhances its keeping qualities, but it must be firm throughout, and especially so on its surface. Those varieties whose seeds are prominent are usually the ones that will keep best. The flesh of the Bubach is rather soft upon the surface, although it is quite firm otherwise, and it does not stand shipping as well as many other varieties.

Elmira, N. Y.

W. H. Beckwith.

College Instruction in Horticulture.

To the Editor of GARDEN AND FOREST:

Sir,—Professor Munson, in closing his very interesting article on "An Outline of a Course in Horticulture," on page 3 of your current volume, invited discussion of the subject. I have since been waiting for some one whose sufficient experience gave him the right to present some positive statement of what a college course in horticulture ought to be. For myself, I confess I have not yet made up my mind, and I should like to venture that a respectable representation of my collaborators are still giving their courses tentatively. Nevertheless, what experience I have had gives me some opinions which differ from those of Professor Munson, and these I submit for what they are worth.

Horticulture is advanced work, considered beside the average college study. It involves a considerable amount of elementary physics, chemistry, and especially botany. Besides this, the facts and principles of horticulture are not so clear cut and self-evident as in the sciences mentioned, and their discrimination requires a higher grade of student ability. For this reason horticulture ought not to begin before the junior year. It seems to me to be a mistake to require more than three courses in horticulture of undergraduates. As many elections may be offered as circumstances indicate, but more than three required courses in this subject cannot be given without crowding out something else which is of more importance for the symmetrical development of the average student than any fourth course in horticulture. If electives are provided, the students who have a taste for plant study may take as much time in horticulture as they can spare from the general required course. Some strong institutions in this country are giving less than three courses. I think two required courses are better than four, but the two should be strong, and anything less would be quite inadequate.

If three courses are required, I prefer the following arrangement: (1) Propagation and pruning. These subjects are closely related, and they come first because of their intimate association with the elements of plant physiology, which should be given in a preceding course in botany. (2) Pomology, which should be made to include small fruits, grape-growing, etc. (3) The modifications of plants under culture. This includes

plant-breeding, theories and applications of evolution, laws and limits of distribution, and the critical discussion of such general physiological problems as fruitfulness, hardiness, etc.

In the first course I have always used Professor Bailey's *Nursery Book* as a text-book. A text-book has many advantages over instruction by lectures, especially with beginners, and, contrary to my preference expressed above, I have always been compelled to begin horticultural instruction with sophomores. In general pomology we are absolutely without a text-book. Barry's *Fruit Garden*, Thomas' *Fruit Culturist* and others are valuable guides and reference books, but there is nothing which has the systematic arrangement and which constantly refers facts to principles as a text-book should. In studying the amelioration of plants, we have Professor Bailey's *Plant Breeding* and his more extensive *Survival of the Unlike*. I have used the former, and am now using the latter. Of course, any instructor who is capable of administering such a course at all will not be satisfied with these for text-books, but he will find either a great assistance to pupils. He can then present his own notions and develop other related subjects as his judgment suggests.

Constant personal contact with growing plants is one of the most essential considerations in the study of horticulture. The effectiveness of this part of the course depends chiefly on the unflinching ingenuity of the instructor. In some colleges the general machinery of instruction and discipline makes this comparatively easy. In other institutions the instructor has the power of precedent and habit against him. It makes comparatively small difference what general plan is adopted if the one condition is secured—constant personal contact with growing plants. Of course, that plan which keeps the student most constantly and keenly on the watch for information from the plants in hand is likely to be the best. For this reason I prefer to assign special original problems to individuals or to small sections of two or three students, rather than to require just so many hours of manual labor. It is extremely hard to prevent shirking by lazy students and lagging by dull ones in work of this kind, but it is worth the effort. Elective courses may be given in landscape-gardening, forestry, vegetable-gardening, floriculture, forcing-house management or other subjects, depending entirely on facilities and demands.

In conclusion I would like to add my invitation to that of Professor Munson for a wider discussion of this subject.

University of Vermont.

F. A. Waugh.

Recent Publications.

The American Fruit Culturist. By John J. Thomas. Twentieth edition, revised and enlarged. By Wm. H. S. Wood. New York: William Wood & Co.

The first edition of this work was published a third of a century ago, and that it has kept on reappearing in constantly revised editions is a proof of its standard value. It contains, according to its subtitle, practical instructions for propagating and cultivating all the various fruits adapted to the United States, and this edition contains chapters on nuts and on wild fruits, subjects which have not before appeared, while the chapter on subtropical fruits has been carefully prepared by Mr. E. H. Hart, of Federal Point, Florida, who writes instructively and with commendable fullness on the cultivation of the Orange, the Lemon, the Citron, the Shaddock, the Lime, the Banana, the Date, the Fig, the Pineapple, the Guava, the Loquat, the Persimmon and the Pomegranate. In reference to all these tropical and wild fruits, as well as the more common domestic fruits, great care has been used in describing and figuring the different varieties of the most approved newer sorts, as well as those of recognized standard value, while the final descriptive list and index remains a most useful compilation, preserving the record of the older varieties which are superseded but kept in the lists as a matter of pomological history. The chapter on insects and diseases is brief, but it contains the best recent information regarding the more common pests, and Professor Bailey has summed up the matter with a compact little treatise on the spraying of fruits for insects and for fungous diseases. It is needless to say that this practice, which is now considered indispensable by every fruit grower, was not heard of when Mr. Thomas wrote the book originally, and that this most important step forward in the management of fruit

plantations is treated with comprehensive intelligence. Of course, the opening chapters on Propagation, Pruning, the Management of Nurseries, and all the other details of fruit-growing are given as they were in the last edition, but after all the value of the book is in its descriptions and figures of the different fruits and in the careful way in which these have been arranged.

Altogether, this remains the best manual of fruit-culture which we have in America, when considered as a cyclopedic account of different species and varieties. But while it is the best of its kind, we may as well say that there is room for a book of another kind—one devoted not so strictly to the varieties of trees as to the discussion of the principles which ought to underlie the entire practice of fruit-growing and the treatment of fruit-lands and fruit-trees. We can hardly have both of these in one book, and it seems that the time is about ripe for the appearance of some treatise which takes a more comprehensive and profounder view of the scientific side of fruit-culture. What is needed now is fundamental knowledge rather than rules, and we shall give cordial welcome to a book written on such lines, especially if it is as thoroughly well done in this direction as this last edition of *The American Fruit Culturist* is in its own peculiar field.

Notes.

The first importations of the new-crop Brazil nuts arrived here from Para a week ago, consisting of 1,200 bags.

A Texas authority on Pecan-culture says that the nuts should invariably be planted with the sharp points upward and about six inches below the surface.

Apples and pears from the United States and Canada have been selling in Vienna this winter, probably the first time they have appeared there in any considerable quantities.

Messrs. Peter Henderson & Co., of this city, celebrate the fiftieth anniversary of the founding of the firm by an edition of their large quarto catalogue on fine heavy paper. It makes a book of 170 pages, containing a full descriptive list of standard and novel plants and seeds and "everything for the garden."

Mr. J. H. Hale stated at the last meeting of the Connecticut Pomologists that recent experiments tend to show that steam is of much greater value than either smoke or artificial heat in protecting orchards from spring frosts. If fires are prepared at a distance of fifty feet apart and kept lightly covered with wet hay or some other material which will hold water all the time and yet not put out the fire, a fog-like vapor will cover the field and modify the temperature so that the orchard will escape when the air about the field is much below the freezing point. Of course, this remedy will not work if there is much wind.

Dried and evaporated fruits for cooking purposes include among domestic sorts blackberries, huckleberries, red and black raspberries, cherries and plums, pitted and containing the seeds, sliced and quartered apples, showy apricots and pears in halves, large silver prunes, the regular dark prunes and raisins. While many of these dried fruits come from California, not a few are from New York and some of the Atlantic coast southern states. Evaporated peaches, for example, are known in the trade as peeled and unpeeled California yellow, peeled fancy Delaware and peeled fancy North Carolina sliced. In addition, currants are imported from Greece, raisins from Spain, prunes and prunelles from France and the cheaper prunes from Turkey, besides Corsican citron and other Italian fruit-peels.

At a late meeting of the Vermont Botanical Club, Mr. Cyrus G. Pringle read a most entertaining paper on "Reminiscences of Botanical Rambles in Vermont." Professor Brainerd alluded to Mr. Pringle's researches throughout the length and breadth of North America, and said that perhaps no living man had seen and recognized as many flowering plants in their homes as he. But, with this wonderful experience in fields which opened before him wider prospects every year, it is very evident that Mr. Pringle has never enjoyed any collecting more thoroughly than he did while searching among the lofty mountains, lonely lakes and unbroken forests of northern New England in his early days. The *Burlington Free Press* has published his paper in full and it makes two columns of fresh and delightful reading.

The current issue of *The Garden* gives a colored plate of *Erythronium Johnsoni*, a comparatively new Dogtooth Violet, which is a native of the Coast Ranges of southern Oregon. The flower is a decided shade of red or red-pink, which is deepest on the outside of the petals, and which is a novel color in this genus. The flowers were shown for the first time in England last year, where they were much admired. The scape grows nearly a foot high, so that when established this will make a handsome plant, and English gardeners are congratulating themselves over a new acquisition among hardy plants. We should be pleased to learn something of the behavior of this plant from any of our readers who are interested in early spring-flowering bulbs and who have tested this one in our eastern states.

A car-load of California fruit donated by growers to the Armenia Relief Committee of this city was sold at auction last Friday. Oranges realized from \$1.35 to \$7.10, and grape-fruit from \$9.00 to \$21.00 a box, the entire lot netting above \$1,000. Choice Navel oranges, from California, sell in the regular wholesale markets at \$5.00, and the best California seedlings cost the retail dealer \$3.25 a box. All oranges have been advancing in price during the past fortnight, and desirable sizes of Valencias were last week worth \$3.50 by the case, while Sicily oranges brought \$2.50. Since the first of the year 64,890 boxes of oranges and 156,970 boxes of lemons have been received here from Sicily alone. Limited quantities of new oranges of the second crop are being received from Jamaica, and bright and russet Florida oranges are still in market, together with Tangerines and Mandarins from the same state.

Mr. Martin Benson writes to *American Gardening* that the Papaw, *Carica Papaya*, makes a most interesting feature in a group of tropical plants, with Bananas and other plants with leaves of the largest size. The Papaw belongs to the Passion Flower family, and has a spongy stem and a crown of broad, long-stalked palmate leaves. Mr. Benson shows the picture of a male plant which was ten feet high, with a tuft of leaves six feet in diameter, and it was planted out in May from a six-inch pot. The largest leaf was three feet across, with bone-white midribs and thousands of small yellow deliciously fragrant flowers in racemes three or four feet long appearing at the base of every leaf. A female plant bore nine fruits. These trees ultimately reach a height of twenty feet. Mr. Benson does not explain how many years they can be kept and transplanted into an open border and back again into a greenhouse. The growth which these plants made, however, seems to be equal to that which is made under ordinary tropical conditions.

Many packages of vegetables which arrived here from Florida last week were refused by the consignees on account of poor condition, and were left on the docks to be sold by the transportation companies for what they would bring toward paying expenses for carriage. The damage was caused by heavy rains followed by extremely hot weather. Cabbage, cauliflower, beets in bunches and string-beans suffered most, and the scarcity of really high-class vegetables has raised the price for the best grades. New beets are now coming from Charleston, South Carolina, and the first asparagus and new potatoes came from the same section last week. Good tomatoes come from Key West and from Cuba in large quantities, and in smaller lots from the Bahamas. Lettuce and other salad plants are being received from New Orleans, but the high cost of transportation by rail limits shipments from that locality. Rhubarb from Michigan is now in our markets. Besides onions from Canada, Spain, Bermuda and Cuba, some are now being imported from France and from Egypt.

It is an old device to plant Lima Beans, Melons, or other tender vegetables in inverted sods, but it is more often talked about than actually practiced. A correspondent of *The Country Gentleman* cuts the close-cropped turf of a rich pasture to fit in a strawberry basket, and in the loosened and enriched soil he plants the seeds some six weeks before the weather is permanently warm. He inures the plants to their outdoor conditions by setting them in a shallow trench two weeks before the time for final transplanting, with a rim of boards around it high enough to give the plants head-room, and around this rim is banked the soil taken from the trench. A tight board covering at night will protect them from frost, and this may be left off when there is no probability of freezing. When the weather is settled the toughened plants can be set out without disturbing their roots and they will keep on growing with no check whatever. Instead of watering the surface of the ground the flat box of plants may be set in a shallow tank of water until the soil is saturated, and in this way the washing and baking of the surface is avoided.

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Quarantine Against Destructive Insects and Plant Diseases.

NOT long ago a correspondent in Denver wrote that a considerable portion of the oranges which he found in that market contained worms, which he described in a general way as resembling those found in chestnuts. We at once wrote him to send us specimens of the infested fruit, if possible, but, although we have not received them, there can be little doubt that this is the larva of the well-known orange-worm, *Trypeta ludens*, which is known to infest oranges in certain districts of Mexico. Professor Cockerell, of the New Mexico Agricultural Experiment Station, in a paper just received, asserts that the oranges from Morelos, Mexico, a district where this insect prevails, have been shipped in considerable quantities into this country during the present season. The shortage of the Florida crop has kept oranges at a price that makes it profitable to export them from that district, and this will explain their occurrence in this country. Few oranges from this part of Mexico come to this port, for they are fit to market at about the time when the Jamaica crop is in season, and with this they cannot profitably compete, but it paid this year to ship them to western cities, and undoubtedly this accounts for their appearance in Denver. As the matter stands, no one need be surprised to find that this insect has secured a foothold during the present year in the orange groves of Florida and California. Orange growers already have enough to contend with, and there is no demand for fresh troubles imported from Mexico or elsewhere, and no one knows how serious a loss might follow the introduction of a new and active enemy.

Professor Cockerell has already written for this journal many articles concerning the scale insects which are imported with fruit, fruit-trees and ornamental plants. In the essay mentioned above he alludes to the well-known fact that our most harmful insects are immigrants, and that we do not know how a species will behave when it reaches a strange land and finds itself under conditions different from those at home. Without its natural checks it may increase inordinately, as did the cottony scale in California. Insects and fungi which infest one plant in one country may find new food in another. We can place no trust in

climatic barriers, for not only can many insects endure great differences of temperature, but they may soon adjust themselves to a new environment, and when Professor Cockerell affirms that scale insects alone, which threaten disaster to our orchards and vineyards, come from all quarters of the globe, the statement is the result of calm scientific judgment based on absolute knowledge, and not the outcome of any childish panic.

Now, there is nothing new in the situation at present, and this threatened invasion of the orange-worm we only use as a text to invite attention to the general fact that while insects and fungi are destroying the crops in this country to the value of a million and a half of dollars every day, there are, perhaps, scores of other larvæ and disease-breeding fungi which would prove quite as destructive as any that are now ravaging our crops if they once obtained a foothold here. And what are we to do about it? Of course, the first thought is a quarantine to prohibit importation into this country of any diseased or insect-infested fruit, tree, plant, cutting or seed; and since it is a national matter the obvious suggestion is that this should be a United States law. Indeed, we have received with Professor Cockerell's essay the draft of a bill which it is proposed to present to Congress at the next session. In a general way this provides that all trees, fruits and other horticultural products should only be allowed to enter the United States at certain ports and under regulations prescribed by the General Government; that all these articles shall be examined by inspectors for such ports, and if clean they shall be entitled to a certificate from such inspector and delivered to the consignee; but if infested with any insect or the germs of any disease they must be shipped back from whence they came or be destroyed within three days from the time of inspection. Now, there is little doubt that Mr. Craw, the efficient inspector of the California quarantine, has done much to protect our horticultural interests from dangerous insects which have entered California ports from Japan, the Sandwich Islands, China, New Zealand, Australia and Mexico, but, of course, the country is not adequately protected with an inspector at one port on the Pacific Ocean. But the difficulty of devising a law for the whole country which shall at once be constitutional and effective is serious, as we have more than once pointed out. Individual states may take action to head off these invasions, but the obstacles in the way of controlling traffic between states seem almost insurmountable. It would seem that Congress ought to be able to shut out the infested oranges of Mexico by a prohibitive tariff, or in some more direct way, just as Germany excludes American pork. But, in order to organize a campaign against this or any specific pest, we must know the dangerous insects and know where they are. It would seem, as Professor Cockerell suggests, that in every country from which we receive plants a competent entomologist should be stationed to determine the presence of pests and warn the people of their probable advent. Professor Townsend's recent travels in Mexico for this very purpose show how much there is to be done, and these traveling entomologists might, whenever the conditions warrant it, inspect the quarantine stations at home and help to keep them in a proper state of efficiency.

The appearance of this Morelos orange-worm illustrates precisely what such an agent might do, for it is only by actually visiting Mexico that it could be ascertained where the infested oranges grow, and once having that information we could have protected ourselves if we had possessed the necessary machinery on the border. Mr. Craw's late reports show that about half the plants which arrive in San Francisco are infested with scales or other insects, and Professor Cockerell is constantly finding new ones. He does not think it necessary that quarantine officers should be skilled entomologists, but holds that any man with sharp eyes, a ready memory, clear printed directions and a set of specimens of the commoner insects could be trusted to guard our interests. We do not coincide with this view.

We consider it absolutely essential that a quarantine officer, if such a position is created, ought to have a considerable knowledge of entomology, with special training and experience.

This whole subject, we are glad to learn, will be discussed at the coming National Fruit Growers' Convention. We cannot afford to sit idly by and allow these repeated attacks upon agricultural industries in their present depressed condition. Fruit growers, truck raisers and the growers of staple farm crops have all they can do to secure a living from the soil. The people who glibly give advice to them "to go into something else," that is, to turn their truck farms into small fruit farms, to abandon the raising of small fruits for dairy products, or to plant vineyards instead of orchards, do not realize how depressing it is to be compelled to revolutionize an entire system of farm economy when the old way is threatened by a glut in the market or by the appearance of some new enemy. It is to be hoped that some means can be devised for the suppression by public authority of pests when they pass beyond the control of individuals. But we must repeat that no more delicate problem than this has ever been presented either to state or national legislation. Some phases of this problem were stated on page 401, in volume vi. of this journal, and we have often discussed the particular cases of the general question. Even if all the fruit, and seeds, and bulbs and plants imported into this country were subjected to rigid inspection it must be remembered that the germs of disease, the seeds of evil weeds and the eggs of noxious insects can be imported in a thousand other ways. When once here the difficulties of preventing their transportation into adjacent states arise, and a spirit of hostility, and perhaps of retaliation, is at once kindled by any attempt to prevent the transportation of infected nursery stock from one part of this country to another. One thing the General Government can do, and the state governments ought to aid it in every way possible, and that is to give moral and financial support to institutions where the scientific study of the contagious diseases of plants and of pestiferous insects is prosecuted, and to give substantial help to the stations where experiments are made to discover the most effective means of eradicating them. The more that is learned about these enemies, and the more widely such knowledge is disseminated, the more certainly we may look for a strong and enlightened public sentiment on this subject, and, after all, this is the one condition essential to the enforcement of a quarantine law or any other direct legislation for the extirpation of infectious diseases or insects.

Second-growth White Pine in Pennsylvania.

DURING a recent trip through Elk, Forest, Jefferson and Clearfield Counties, Pennsylvania, I was repeatedly told that the White Pine never followed itself in forest renewal; that on White Pine lands from which the timber was removed a vigorous growth of hardwoods would appear, but that Pine never came again on such lands, or at least not until the hardwoods had prepared the soil for a second crop of Pine. Among others a leading lumberman of Elk County held strenuously to this doctrine, and this gave an added interest to the examination of the woods. My first stopping-place, after the interview with the Elk County man, so completely refuted his contention that it is hoped he may visit the slashings of the Du Bois tract, and then apply the result of his observations to the care of his own extensive holdings.

In 1859 a cyclone destroyed the timber on a strip of land half a mile wide and of great extent, its path crossing the Du Bois tract in the north-west part of Clearfield County. A new growth has, of course, sprung up in the path of the storm. Upon one part of it, which by a fortuitous combination of circumstances has been protected from fire, there is a vigorous stand of young White Pine, mixed with hardwoods. Seen from an adjoining hill the Pine seems the

most plentiful species, and a careful study resulted in a surprisingly small percentage, but explained measurably the erroneous theory regarding the absence of White Pine generally in second-growth timber.

An acre, believed to be representative of the protected area, was measured off and all the trees counted, resulting as follows: White Pine, 285; Aspen, 66; Beech, 138; Sugar Maple, 130; Silver Maple and Red Maple, 130; Black Oaks, 16; White Oak, 1; White Ash, 24; Cucumber Tree, 96; Black Cherry, 79; Black Birch, 432; White Birch, 12; Basswood, 6; Ironwood (*Ostrya*), 2; Tulip Tree, 13; Chestnut, 2; Willow, 10; Hemlock, 50.

To this list must be added a shrubby undergrowth of Alder, Blackberry and other plants.

It will be observed that of the 1,480 trees counted on the area, only 285, a little less than one-fifth, are Pines. Of this number 90 were estimated at forty feet or more in height. These Pines were the tallest trees on the acre, and this fact, coupled with their winter foliage, gave them the appearance of being the most numerous. The tallest Hemlock on the acre was hardly more than six feet, while the great majority of the Hemlocks were less than two feet high.

The age of the oldest Pines was found to be thirty-five years, showing that they sprung up within a few years of the destruction of the old growth.

An effort was made to determine the age of small Pines by pulling a number of trees up to three feet in height and counting the annual rings at the collar, using the number of whorls of branches as a check. For this purpose a "slashing" (land whence the merchantable timber has been cut) not far from the sample area above noted was carefully examined. Immediately adjoining the slashing was a splendid Pine forest, where there stood an average of thirty-five Pines to the acre, the remaining trees being Hemlock and a small admixture of hardwoods. In the slashing the ground was covered with a dense growth of Brambles, young Maples, Birch, Beech, etc., rising to a height of ten or twelve feet. It was evident that fire had not touched the tract since the timber was cut, and a careful examination revealed a number of young Pines growing healthily in the shade of the hardwoods. Unfortunately, a fall of snow prevented the counting of the little Pines on measured areas. Between forty and fifty trees were pulled, their ages determined and height accurately measured, the result being as follows: Two years old trees, 3 inches high; three years old, 5 inches; four years old, 8 inches; five years old, 10½ inches; six years old, 31 inches; seven years old, 31 inches; eight years old, 27 inches. It is not to be inferred, of course, that the growth of Pine becomes less the seventh and eighth years; it simply happened in this instance that the twelve trees of which the size was determined had not made as good growth as those of less age. It will be noted that during their first four or five years the White Pine seedlings grow very slowly, and it is easy to understand that there might arise a doubt of their ever making large trees, compared with the more rapid-growing hardwoods which shelter them. So, too, the tiny seedlings might easily escape notice entirely, and thus the false generalization with which this article is headed is explained. However, in studying the development of the young growth on the sample area above noted, it was found that the Pine begins a rapid height growth when from ten to fifteen years of age, and between the ages of fifteen and fifty years it is no unusual thing for it to increase in height from two to three feet in a single year. Thus we find in the slashing tiny Pines which require a sharp look-out to discover, while in the path of the cyclone, other conditions than time being similar, the lusty Pines seem to dominate all the other growth.

The two instances above cited demonstrate the ability of White Pine to reproduce itself, provided fire is kept away from it. The proviso sounds simple enough, but the thousands of desolate acres marked by charred stumps and ash-covered soil which lie between Williamsport and

Warren along the line of the Philadelphia & Erie Railroad, prove that there must be some extraordinary difficulty in protecting from fire lands that have been cut over.

Washington, D. C.

Charles A. Keffer.

The Arrangement of Flowers.—II.

LONG-STEMMED FLOWERS.

AN equally important class of flowers for table decoration are the long-stemmed flowers. Two flowers prominent in most gardens, poppies and roses, may be taken as examples. I like the clear, slender glass vases for flowers, especially the ones that show the leaves and stems down to the base. Highly ornamental vases of any description are not appropriate, and the flowers themselves must be the conspicuous feature. There are, of course, exceptions. At a luncheon the central decoration of the table was a succession of little Dresden lords and ladies holding pictures and cornucopias as large as themselves, in which were a few rare roses and Orchids. The effect was pleasing, but these choice flowers, unlike our ordinary garden flowers, seem to harmonize with costly porcelain. Hare-bells and Trailing Arbutus would have looked altogether out of place in the same vases. Winter hot-house flowers show to good advantage in Bohemian cut glass and other handsome vases. In summer, in the country, for flowers of the fields and woods the vases should accord with the house and surroundings; but no positive rule can be laid down for appropriateness or good taste in their choice, and good sense is the safest guide. It is difficult to arrange flowers to have an artistic effect in a rose-bowl. The principle of the rose-bowl is wrong, and a vase should be smaller at the bottom than at the top. The tall, slender green or white vases which look like huge morning-glory blossoms are beautiful for flowers as well as appropriate. The flowers grow in this way, the bushes small at the base and broader toward the top. A Poppy garden should contain fancy grasses, and no arrangement of poppies is perfect without some of these, while oats, wheat and timothy contribute to a harmonious effect. Only a few poppies should be placed in a vase, so that the effect may be light and delicate. They are a fairy-like flower, and the spirit of the flower should be carried into the arrangement. As many as sixteen tall, slender lemonade glasses may be disposed on the table for only about fifty poppies. The finished effect is that of poppies growing, and each delicate petal shows to its best advantage. Any number of glasses may be placed in some definite order down the centre of the table, such as first a central one, then four surrounding it, then a chain of three at the two ends of the square. The grasses should be put in highest at the centre, leaning first one way and then another, just as they grow. The highest poppies also should be placed in the centre, and perhaps the darkest ones, and the lighter and smaller ones used until the small glasses at the ends of the chain hold the finest and most delicate of all. Fewer flowers are required for an arrangement of this sort than one would think, and showy displays may be made with no more blossoms than are sometimes seen crowded into one vase, when the only effect is a mass of color.

Roses may be treated in much the same way, substituting Maiden-hair or other Ferns for the grasses, or using only their own beautiful waxy leaves.

Rangeley, Me.

Dorothy Root.

The Islands of Lake Champlain.

IT has long been an accepted notion that the shores and islands of our great lakes offer special advantages in fruit-growing. Some of the most noted localities in America for the production of apples, peaches and grapes lie along or in the Five Great Lakes. Lake Champlain ranks in size below only these, yet contains an island area greater than any. The fruit-growing industries on the Champlain islands, however, have but recently begun the course of development for which the location gives so

much promise. But apple-growing is now gaining rapid headway, and it seems probable that fruit-raising will soon be the distinctive industry of the islands.

Several of the smaller islands along the western shore belong to the state of New York, but the greater islands are all parts of Vermont. These are principally included in Grand Isle County, which is the north-western county of the state. The whole of this county is surrounded by the waters of Lake Champlain, except a narrow neck which connects the town of Alburgh with Canada. Grand Isle County consists of three large islands and the peninsula mentioned, together with several unimportant smaller islands. This constitutes an insular area of eighty-two square miles, of which 47,250 acres are in farms (Census of 1890). Alburgh, the peninsula town, is considerably the largest one in the county. The island of South Hero has an area of about 20,000 acres, is about twelve miles long, and varies from one-fourth to five miles in width. North Hero is a long, narrow island of irregular form, containing 6,272 acres. Isle La Motte is two miles wide and six miles long, containing 4,640 acres. These islands are separated from each other by very narrow straits at certain points, and from the mainland by a width of water varying from half a mile to several miles.

There can be no question but that the surrounding waters of Lake Champlain materially modify the climate to the favorable prejudice of fruit-growing. There seems to be no satisfactory way, however, of measuring the extent of this modification except by its effects on plant-life. Such purposes of comparison may be served by stating that such apples as Northern Spy, Rhode Island Greening and Ben Davis thrive, while Baldwins are not long-lived, and King of Tompkins County is decidedly uncertain. Last winter all fruit-buds of Japanese and Domestica varieties were frozen, but this is unusual. Peaches have been grown under special protection.

Vermont Experiment Station.

F. A. Waugh.

Entomological.

The Strawberry-root Louse, *Aphis forbesi*.

THE Strawberry-root louse is found throughout the state of Delaware and probably throughout the peninsula, although it has attracted attention only in a few localities, and too often the grower of Strawberries is not sufficiently intimate with the pest to detect its presence until his plantation is practically ruined. To one who knows it, however, its presence or absence is generally revealed as soon as a plantation is entered. Bare spaces scattered throughout the field at once arouse suspicion, but when it has intrenched itself in sufficient numbers to attract attention to its actual devastation, the Strawberry-bed will disappear with remarkable rapidity. In a plot at the station, containing about seventy-five varieties, which were in a flourishing condition in the spring of 1896, there are not a dozen varieties remaining.

This louse is a small dark bluish green insect, oval in shape, which gathers in great numbers on the roots and often in the crown of the plant, and there pumps out the juice. The eggs can also be seen in both of these situations, and are minute, oblong, shiny black bodies. The aphid is attended by a small brown ant (*Lasius aliensis*), which probably bears the same relation to this species as it does to the Corn-root louse. I am not aware that any winged form has been discovered, and its passage from field to field must be slow, or practically impossible. The most practical form of treatment at present is in the rotation of crops, whereby the aphid may be starved out. The most probable means of distribution is by infected plants coming from the nursery, where its presence has not even been suspected. It is easily treated on nursery stock with bisulphide of carbon, kerosene emulsion or tobacco-water.

The life history of the aphid has not been carefully worked out. It was first discovered and figured by Pro-

essor S. A. Forbes, of Illinois, in his Thirteenth Report, page 102, but the specific name, *forbesi*, was not given to it until 1889, when Professor Weed, of the Ohio Station, vol. ii., No. 6, named it in honor of Professor Forbes.

Newark, Del.

G. Harold Powell.

Foreign Correspondence.

London Letter.

SAXIFRAGA STRACHEYI.—This plant was introduced from the Himalayas fifty years ago, since when it has always been grown here and there in a sheltered place on the rockery, where it produces its large corymbose clusters of red flowers in April or May. It also proves to be an excellent plant for pot-culture to flower under glass in February. The thick fleshy rhizomes are established in pots during the summer, which is easily done, and they are kept in an unheated frame till January, when they are placed in a temperature of about fifty degrees in a light position. This induces them to push up their flowers, and by the middle of February plants in six-inch pots have from three to six clusters, as large as an ordinary bunch of grapes, of rosy pink flowers. The only defect they have is due to the absence of leaves, which do not develop till after the flowers have faded, but this defect is easily remedied by a little arrangement. *Saxifraga ligulata* may be grown in the same way, and it develops its leaves at the same time as the flowers; the latter are pure white when forced.

SPRING-FLOWERING IRISES.—Given a mild winter, we have Irises in bloom in the open air all through the winter. Herr Max Leichtlin notes the flowering of the charming little *I. histrio* with him in November last. I have seen it in bloom several times since Christmas, and at the last meeting of the Royal Horticultural Society (February 9th) it was shown in beautiful condition by Messrs. Wallace, of Colchester. We have beds of *I. reticulata* in full flower on our lawns now, and in other parts of the garden the allied *I. Bakeriana*, *I. histrioides*, *I. Krelagei*, *I. sophenensis*, *I. Vartani* and *I. Kolpakowskiana* have been lately or are now flowering nicely. These Irises belong to the same category as Snowdrops, Snowflakes, Winter Aconites, blue Squills, *Chionodoxas* and early Crocuses in their value for early spring effects. They are easily managed, they flower freely, and they are of the most charming shades of blue. We cannot have too many of such plants in gardens where they will do in the open, and where they will not they are worthy of frame culture. It is singular that our earliest spring flowers are blue or white, followed by yellow.

CROCUS SUSIANUS, better known in gardens as *C. reticulatus* or the Cloth of Gold Crocus, is a variable species and one of the forms is decidedly distinct and beautiful among the many species of spring-flowering Crocuses in bloom with us now. The leaves are short, the flowers are of medium size and short-stalked, and the upper or inflated part of the tube is of a rich orange-yellow color, the outer segments being covered with almost confluent streaks of brown-purple. In dull weather the segments do not close upward, as in other kinds, but they curl down and inward, or revolutely, so that they are always attractive. Probably this character was recognized by Haworth when he named this species *C. revoluta*. It is a native of the hills of the Crimea and of Asia Minor. This must not be confounded with the common yellow or Dutch Crocus of gardens, the flowers of which also are striped with brown outside, but which are larger, coarser, of a different shade of yellow, and they do not possess that revolute character of segment so characteristic of *C. Susianus*.

THE BEST SNOWDROPS.—First I would place *Galanthus nivalis*, which grows wild or naturalized in many parts of this country and Ireland. It lives and multiplies among the grass under deciduous trees, and is charming in modest patches in the garden or when covering acres in the park or plantation. The largest-flowered and most striking species, however, is *G. Elwesii*, with which we have been familiar for twenty

years, and which is now grown in large quantities in all good gardens. Here it will not live more than a year or two in grass, but in a north border we have a large colony which is as thick now as when planted three years ago. Considerable variety is shown in the size and form of the flowers and also in the width of the leaves of this species, where it is grown by the thousand. The largest flowers I have seen this year are one and a half inches long, and the widest leaf an inch. Several have developed two flowers on a scape. The third is *G. Ikariae*, introduced from Smyrna in 1893, and now abundant in English collections. It has broad, bright, shining green leaves and long, pointed "drops," the inner segments being marked as in *G. nivalis*.

ADONIS AMURENSIS.—I noticed this Japanese species last year when it flowered for the first time at Kew in February. It is flowering again now and is better than it was last year, the flowers being larger and of a brighter yellow. So far it has proved quite hardy. The stems, which spring in a dense cluster from the root-stock, are from nine inches to a foot high, clothed with elegant dark green feathery leaves and terminated by short-stalked Anemone-shaped flowers, two inches in diameter. It is a native of Japan, where it is a popular garden plant and is represented by a considerable number of varieties.

TULIPA VIOLACEA is the first Tulip to open its flowers this year. It is a dwarf species, related to *T. sylvestris*, about six inches high, the flowers two inches long and colored red-purple, with a blue-black blotch at the base of the segments. It is a native of Persia, from whence it was introduced through Herr Max Leichtlin a few years ago.

LILIUM GIGANTEUM.—This stately Lily grows well along with the hardy Bamboos at Kew. A plant which flowered in 1895, and afterward yielded a quantity of seeds, offered a good opportunity for securing a big batch of seedlings; accordingly, the seeds were sown in shallow boxes in October, and these were placed in a greenhouse where Cape bulbs are grown. But the seeds did not germinate in the spring as expected, and it was conjectured that a higher temperature would wake them up. One of the boxes was removed into a tropical temperature, but even here the seeds showed no signs of vegetating. And now, after waiting sixteen months, the seeds are germinating freely, those in the cool being just as forward as those in heat. The lesson to be deduced from this is that seeds of *L. giganteum* sown as soon as ripe take over a year to germinate, whether sown in a tropical or cool temperature. It takes from five to seven years to grow a seedling to flowering size.

LILIUM AURATUM.—The Japanese growers, or those who are responsible for the preparation of the bulbs for export to Europe, have not been successful this season with this popular Lily. Thousands upon thousands of the bulbs have arrived here quite rotten, so that, although the consignments have been greater than in any previous season, the number of sound bulbs actually received has been a long way below the average. Is it possible that less care is taken in the cultivation and harvesting of the bulbs than used to be the case, or is the fault in the packing? At any rate, the failure is much deplored by would-be buyers here. Has this Lily ever been tried in Bermuda? It would, if successful, prove a better venture than *L. Harrisii* even. I offer the suggestion for what it is worth. England alone can take hundreds of thousands of bulbs of *L. auratum* if the price is reasonable. *L. Henryi* is another Lily worth farming on a large scale.

NATIONAL VIOLA SOCIETY.—The modest Pansy has risen to the dignity of a Society all to itself. Mr. W. Robinson, who is the President, is, no doubt, also the prime mover in this very laudable effort to develop the Pansy family, or rather to bring it into that prominence which, from its variety, merit and adaptability, it eminently deserves. The first annual meeting of the Society was held last week when it was decided to repeat the exhibition held in the gardens of the Royal Botanic Society, Regents Park, last year, when the display of Pansies, Violas, etc., was the largest of the

kind ever held in the south. I have before described the beautiful effect produced in Mr. Robinson's garden at Gravetye by planting bedding Violas of differing kinds to cover the soil of his Tea Rose beds, and I have seen equally beautiful effects obtained by using these plants for ordinary bedding. In hot dry weather they are apt to suffer unless the soil is retentive and kept moist by watering. We have now a considerable number of breeders at work among these plants.

London.

W. Watson.



Fig. 12.—*Agave attenuata*.

New or Little-known Plants.

Agave attenuata.

A MAGNIFICENT specimen of this stately *Agave* has been in bloom for several weeks in the United States Botanic Garden at Washington, and is reproduced in the illustration on this page. This is the first time the species has flowered in Washington, and, from a rather hasty examination, it appears to be the first time it has flowered in this country. The plant now in flower was bought in Such's nursery by Mr. W. R. Smith more than twenty years ago. Its previous history is unknown, but it

undoubtedly came from Mexico, the home of the species. The flowering plant differs from figures and descriptions in having a perfectly erect, stiff spike of flowers, instead of being curved. In all the other characters the plant differs very little from the description of *A. attenuata*. In our specimen the woody stem below the crown of leaves is four feet high and one foot in circumference at the thickest point, which is a short distance below the crown. It is marked with quadrangular scars, three to four inches wide by one inch deep. The crown, which consists of twenty or more immense leaves, is, indeed, a handsome sight, measuring as it does nearly six feet in diameter. The leaves are first erect, but when mature they are spreading, and in age drooping, the lower ones gradually falling off, leaving the peculiar scars referred to above. The larger leaves are from two and a half to three feet long, from six to eight inches broad at the widest point, which is about two-thirds of the distance from the base, gradually tapering to near the base, where they are three or four inches wide, while they rapidly taper upward into long weak spines; the leaves are very glaucous on both sides, while the margin is entire and thin, at first whitish, but in age brownish. During the flowering period the larger leaves drop off, leaving only ten to twelve, which are not more than two inches in width and two feet long. The peduncle is only about one foot long, but is very thickly covered with large leaf-like bracts, somewhat appressed, but spreading at the base, and acuminate. The flowering spike is very dense and fully five feet long; the flowers are in twos subtended by bracts; these bracts are green, attenuate, horizontal, the lower ones being five inches long. The flowers are mostly sterile, the perianth tube very short, the stamens much longer than the petals. This plant has been in bloom nearly three months, while it was nearly two months in developing its flower-spike.

The species was first described by Salm Dyck in 1834. It was afterward (1862) described by Sir William Hooker as *Agave glaucescens* in *The Botanical Magazine*, and is sometimes found in cultivation as *A. spectabilis*. It has been illustrated in *The Revue Horticole*, figs. 31 and 32 (1875); in *The Botanical Magazine*, t. 5333 (1862), and in *The Gardeners' Chronicle*, fig. 55 (1887), figs. 63 and 64 (1895). It was introduced into cultivation about 1834. It flowered first at Kew in 1861, and has flowered several times since. It is reported in *The Gardeners' Chronicle* to have flowered in the Coimbra Botanic Garden in 1886 and 1887, in the garden of Mr. Hanbury at La Mortola in 1890, in the gardens of His Majesty the King of the Belgians at Lacken in 1895.

The plant has been widely distributed in gardens, and will doubtless be frequently found in flower in the future.*

Washington, D. C.

J. N. Rose.

Iris Hartwegii, Baker.

FREQUENT inquiries about this pretty *Iris* show that it is a favorite, and lead me to put on record what I know about the species.

Iris Hartwegii occurs in California at elevations of from 1,300 to 4,500 feet, in a belt almost exactly coinciding with that occupied by *Pinus Lambertiana*. Like this *Pine*, it does far better on cool, protected northerly slopes than on shallow-soiled hot slopes facing south. The fact that its large clumps die out if the surrounding *Pines* and shrubs are cleared off, proves that this *Iris* prefers the shelter, and it does well even when the needles from the *Pines* smother almost everything else on the ground. The tufts may be small or as much as twenty-four inches in diameter. I have seen whole slopes covered with them. The tender India-yellow color fades in the hot sun very rapidly, but a field of these flags, lit up by the rays of the sun fall-

* The most important references to the species are the following:

Agave attenuata, Salm Dyck. *Hort. Dyck.*, 303 (1834).—*Rev. Hort.*, 149, figs. 31 and 32 (1875).—*Gard. Chron.*, ser. 2, viii., 748 (1877).
Agave glaucescens, Hooker. *Bot. Mag.*, t. 5333 (1862).—*Gard. Chron.*, ser. 2, li., 219, figs. 53 and 55 (1887); ser. 3, viii., 560 (1890); ser. 3, xvii., 457, figs. 63 and 64 (1895).

ing through the stand of Pines, is a beautiful sight. The stems range from twelve to eighteen inches at the lowest limit of the plants, to but six or eight inches at its highest range. The size of the flowers varies but slightly, though the falls and standards are somewhat reduced in the highest altitudes.

The climatic conditions under which it grows are naturally varied when so wide a range suits this species. The lowest temperature at the height where it begins to appear was 22 degrees, Fahrenheit, in eight years of observation, the highest 112 degrees. Although the seeds from which most trees of the Sugar Pine (*Pinus Lambertiana*) are raised have been gathered at altitudes between 3,000 and 4,000 feet, it must not be expected that Iris gathered from low limits would do equally well in eastern gardens. The dwarfed plants at 4,500 feet altitude are exposed to very severe winters, tempered only by the heavy snows which fall in those regions. At Panther Creek, Amador County, I have known snowfalls ten feet in depth, while one winter in about five may not know snow deeper than ten inches. Good drainage seems essential to the growth of this Iris, and, above all, a period of rest during the whole summer. In our Sierras, at the altitude of 1,300 feet, no rain falls after the middle of May, unless there happens to be a shower about the Fourth of July, until in fall when the advance showers of winter set in about the middle of September. The mean rainfall at 1,300 feet elevation is about thirty-five inches, most of which falls during December, January and February.

Applying these observations to eastern conditions, I would say Iris Hartwegii should have the most sunny place in the garden, unless your summer equals the extreme heat I have recorded. It should be well up on a slope, above a rock wall, or in a similar position, and kept from freezing too deep in the ground. While there are far more gorgeous Irises to be found, and most of them are more easy of cultivation, it is the charm of succeeding with what seems refractory which will add greatly to the pleasure of cultivating Iris Hartwegii.

Berkeley, Calif.

George Hansen.

Cultural Department.

Notes on Hardy Plants.

MANY hardy plants in cultivation are valued mainly because they come into bloom very early in spring, when there is a dearth of bloom outside of the greenhouse, or because they bloom late, when most other flowers are past. *Helianthus Maximiliani* belongs to a very late-blooming class; it hardly matures its flowers here in Vermont, and it never seeds here. It seems quite hardy, and, if not so late, would be a good plant for this section. Its lateness should be in its favor a little farther south. It never has had a chance to develop its full height here, but I understand that it grows to be eight feet or more high in the latitude of New York.

One of the best Sunflowers I have tried here is the Willow-leaved *Helianthus*, *H. orgyalis*. It is a tall and stately plant, which, under favorable conditions, attains a height of eight and ten feet. It is also late in blooming, but its flowers come to maturity here. These are orange-yellow, not large, but numerous, borne in large panicles, and they last a long time. It takes more than a severe frost to injure them, and nothing short of a freeze which kills most plants seems to affect it. The long stems are well set with narrow drooping leaves, which give it an attractive appearance during the entire growing season and until winter has fully set in. This continuous attraction throughout the season is seldom found in hardy perennials. The plant shows to best advantage when massed in a round bed. It spreads from the root quite rapidly, and a few plants soon form a large clump.

Erigeron glaucus, of western North America, has much to commend it to growers of hardy perennials. In good garden soil it attains a height of ten to fifteen inches, and bears good-sized flower-heads of a purplish hue. It needs only ordinary garden soil to succeed.

The Willow-leaved Ox-eye, *Buphthalmum salicifolium*, of Australia, grows a foot and a half high, with good-sized flower-heads of Daisy-like shape, resembling those of *Coreopsis lanceolata*, but of a deeper orange shade. It is perfectly

hardy here and grows freely without extra care. It blooms in early summer and continues for a considerable time.

For rock-work in full sunlight, or in sunlight half the day, the Barrenworts (*Epimediums*) make a pretty group. *E. violaceum*, which is a variety of *E. macranthum*, is the most robust grower with me. All the species do fairly well here after they are established. The foliage is their principal attraction, though the flowers are pretty. *E. niveum* has delicate white flowers, and those of *E. sulphureum* are of a sulphur-yellow shade. *Epimediums* are propagated by division of the root, and this is best done in the latter part of the summer.

Charlotte, Vt.

F. H. Horsford.

The Japanese Ampelopsis.

A FEW hints on the cultivation of this deservedly popular climber, *Ampelopsis tricuspidata*, or *Veitchii*, as it is sometimes called, are likely to be useful, especially regarding the raising of young plants; this may be done from cuttings or seeds. The latter method probably entails the least labor and trouble, but when uniformity is desired the plants must be grown from cuttings, for the seedlings are apt to vary greatly in size, in form of leaf and in vigor of growth. All the plants assume more or less gorgeous tints in fall, but the coloring varies so much that harmony can only be had from carefully selected cuttings. The cuttings should be young growing points taken with a heel toward the end of the summer, and struck in sand either in a cool propagating-bed or a cold frame, or inserted singly in small pots in a free sandy compost. They quickly strike root and become well established before the leaves fall off. They should be kept dormant through the winter and protected against severe freezing. In spring they may be planted while yet dormant, or after they have started a little.

Seeds germinate best when sown soon after they are gathered, which is usually about the beginning of November. I have seen the berries sown entire, but it is better to wash the seeds out. They should be sown in flats in a light sandy compost and lightly covered. Germination is somewhat slow, but nearly all will come sooner or later if the seeds were thoroughly ripe when gathered. The soil must not be kept too wet, or the seeds will rot after germination has taken place. The seedlings will be ready for potting into small pots about the middle of February, and it is not advisable to attempt this operation earlier, as nothing is gained by handling the plants when very small. One more shift will be required into three-inch pots; they can then be planted about the end of May, having previously been gradually hardened off. These plants are not particular as regards soil in their permanent quarters, but if it is poor where the plants are to be set it is worth the labor to remove it and replace it with soil of a better quality. The plants should be set close to a wall, and a fastening of some sort provided to keep the shoots attached until they have made sufficient growth to enable them to cling of themselves. Carefully handled young seedling plants under favorable circumstances will grow to be eight to ten feet high the first season, with an abundance of luxuriant foliage. Planted about three feet apart they will do much to beautify an unsightly wall in one season.

If the wood is not sufficiently ripened the fall after planting slight protection may be needed, otherwise this is not necessary. Branches of evergreen trees placed against the wall over the plants make a convenient covering.

Tarrytown, N. Y.

William Scott.

Carnation Notes.

BY this time most growers will have inserted cuttings for next winter's plants; some easily rooted and quick-growing varieties, such as Daybreak, Alaska and William Scott, will still make good stock by planting-out time, but I prefer to have the main portion in somewhat earlier, as a much larger percentage of the plants will root in January and February than later in the season, when it is more difficult to avoid extremes of temperature. Our cuttings will be boxed off about the middle of March; this will allow ample time for them to make nice plants by the time they can be transferred safely to summer quarters early in May. Plants rooted during December and early in January expressly for summer flowering are now in boxes on the shelf of a cool house. The cuttings have been stopped once, and will shortly be transferred separately to three-inch pots. About the end of March they will be placed in a frame in which a few inches of warm manure has been well-tramped down and covered with a coating of coal-ashes. If potted much earlier the little plants are liable to become

pot-bound, and do not start so well when set in the open ground. A good list for outdoor flowering is the following: Mrs. Fisher, white, still the best of the whole section; Ferdinand Mangold and Sebec, crimson, the latter a seedling raised by Mr. Nicholson, of Framingham; William Scott, Nicholson and Abundance, pink; Daybreak, shrimp-pink, and two scarlet seedlings. We have not found any striped or yellow varieties which will bloom profitably, but purpose trying a few of the newer sorts this summer again.

Plants in the benches are now requiring more liberal waterings and more frequent applications of fertilizers. We prefer to allow the soil to become moderately dry before watering, and then give it a thorough soaking. Our plants were recently picked over and all decaying foliage and useless growth removed, after which a mulch of well-pulverized, but rich, manure was given, and a further and heavier mulching will be given before hot weather sets in. Every year we find something new in Carnation-culture, and one important point is that these plants will thrive on more frequent and richer applications of liquid foods than they usually receive. We must bear in mind that they have but a few inches of compost to grow in to begin with, and having already been in the benches nearly six months they have extracted most of the available nourishment from the soil. To keep them growing and flowering vigorously it is absolutely necessary to feed them well. At present I am giving liquid fertilizers once a week, using sheep manure, sulphate of ammonia and cow manure, alternately, of moderate strength. We use some soot with the manure. As the season progresses the strength of the nutriment will be increased.

Rust, which attacked one or two varieties quite badly earlier in the winter, has now almost disappeared. Diseased plants are sprayed regularly with the arsenical solution, and badly affected or decaying foliage is picked off. At this season ventilation can be freely given on most days. Carnations detest coddling, and if they enjoy a free circulation of air stouter stems and fewer burst calyces will be seen. It pays to disbud all varieties, and this practice is almost universally adopted now. Some sorts, like Jubilee, Eldorado and Daybreak, need little disbudding, but, on the other hand, McGowan, William Scott, Portia and Hector make a large quantity of side-buds, the last-named being, perhaps, the worst to handle. The flowers of some sorts, particularly those of pink shades, fade quickly when exposed to strong sunlight. Blooms of William Scott should be picked before they fully expand, or they will not hold their color, and Daybreak blooms lose their lovely shrimp-pink shade if left on the plant a day too long. All Carnations should be gathered and placed in water in a cool room some hours before being used. Florists now adopt this plan, and the blooms swell out half as large again, the stems become more rigid, and the flowers after long shipment are found in a much fresher condition than if they had been picked, packed and dispatched at once.

Complaints are heard this season from various flower markets that the popular William Scott has to some extent lost its favor with the public, and the prices realized on this variety are lower than on almost any other sort marketed. It has proved such a money-maker for the past two or three years that every florist has been tempted to grow it largely, and the markets have at times been glutted with it. Before we can afford to dispense with it, however, some superior new variety must be introduced to take its place. It is the most persistent bloomer we grow; its one drawback is that the flower fades if not picked before becoming fully expanded. It yields three times as many flowers as any other pink variety we have grown, and we do not expect to see it discarded or relegated to an inferior place for a year or two. Madame Diaz Albertini is only grown to a limited extent, and it does not bloom freely enough to be profitable. Neither does Bridesmaid, although it produces an excellent flower on a first-class stem and holds its color well. Where quality rather than quantity is desired it is worth retaining. Triumph, certificated at the Carnation Show in Boston in 1895, proves rather disappointing and does not bloom freely. Abundance has short, stiff, wiry stems; the flowers are of fair size and good color, and it is a more persistent bloomer than any other new sort I have tested. Della Fox was very rusty earlier in the season, but is now almost clean. It is not popular in this section as its color is not fancied so much as the paler and more reliable Daybreak. Its general habit is better than that of Daybreak, but it is not likely to attain anything like the popularity of that kind. In dark shades Thomas Cartledge proves reliable, but we still retain a few plants of the good old variety Tidal Wave, which, as a general rule, is rather a dwarf grower, although our plants this year yield stout stems eighteen inches long, in clayey soil. Some promising new

pinks, such as Victor, Mrs. McBurney, C. A. Dana and one or two others, are offered for the first time this season. Some good scarlets appear to have been exhibited in the seedling classes at the Cincinnati Show, and a reliable scarlet sort of good size is much needed. We grow Hector chiefly, a variety raised by Mr. I. Wright, of Wellesley Hills. In color and size of flower it is all that could be desired, but it produces far too much grass and lacks strength of stem. Its flower mounted on a stem like that of Jubilee would be superb. Jubilee has proved the premier scarlet at the great Carnation Show. The flowers shown at Boston in 1895 by the raiser, Mr. E. G. Hill, had the finest stems of any variety exhibited, and at Cincinnati it has eclipsed all others of its color. We grew a few plants of it this season, which were very small when housed and did not flower until Christmas. They have produced some first-rate blooms on perfect stems and with an exquisite odor. The plants were rusty early in the season, but are now clean, and we hope to secure better results next winter from cuttings rooted earlier. Every shoot produces a flower, and after one crop is picked the plants look like stumps, but soon throw up another set of flowers. There will be no use for such small varieties as Portia and E. G. Hill where Jubilee will succeed.

Eldorado has proved the most reliable yellow variegated sort we have ever grown, and we consider it the best of its class sent out up to date. It is a very free bloomer and we have not been troubled with any burst calyces. It quite eclipses Bouton d'Or, which was one of the star yellows in 1895-6. Buttercup occasionally gives a superb flower, but it is not a persistent bloomer like Eldorado. The blooms hold fresh on the plant longer than any other sort we know; a flower kept in good condition over three weeks in February. The new variety, Mayor Pingree, raised by John Breitmeyer & Sons, Detroit, will make a strong bid for public favor next year, judging from flowers we have seen. Helen Keller this season has done the best of any of the white variegated section with us, from plants grown in heavy clay loam. Armazindy, sent out by E. G. Hill & Co. last year, has a superb stem and gives occasional exceptionally fine flowers, although the plant has rather a sprawly habit. One or two promising new sorts in this class are now being put on the market, but I do not know enough of them to venture any judgment.

Lizzie McGowan has been more widely and largely grown than any other white the past season, and the flower markets have suffered from a glut of it, as in the case of William Scott. Though inferior to some of the newer sorts in size and form, it is still an admirable all-round kind. Alaska is also good and popular, although care must be taken in propagating it to select cuttings from the cleanest and most robust plants, or there will be danger of leaf disease. Crystal, raised by Mr. Fisher, of Framingham, has a huge flower, but it bursts badly here in winter and does not prove a very free bloomer. Edith Foster, sent out by Peter Fisher & Co., Ellis, Massachusetts, is well liked where grown; the flower is not very full, but is produced on a good stem and it is quite prolific. Mrs. Fisher is still clung to by some growers, and for outdoor blooming it is indispensable. Occasionally it is seen well grown, as at Mr. Tailby's, of Wellesley, who finds it the best money-maker on his place still. Flora Hill, the champion white at Cincinnati, and Harrison's White, said to be a sport from William Scott, are two novelties likely to be tried in many places next winter. Nothing in crimsons yet beats F. Mangold with us. Meteor we will discard after two years' trial.

Taunton, Mass.

W. N. Craig.

Hardy Ferns.—Every one who has a garden, however small, can find a place for a few hardy Ferns, particularly of our common native sorts. What they require first and above everything else is shade, and this means that they will thrive best on the eastern or northern side of a dwelling or wall, or in any other situation where the afternoon sun does not strike them fully. It is not usually best to plant them under trees, for the roots of trees rob the soil of the moisture which is needed by the Ferns, and besides this, streams of water after rains will flow down from the branches on some of the fronds much to their injury. I have an interesting and thrifty collection of native Ferns which are planted on the eastern side of a house, where they have the sunshine until noon, but after that they are in shade. Among twenty-five species and varieties which can be collected in the vicinity of Philadelphia, half a dozen are evergreen, and all of these should be planted. The best time to collect is in the late summer. They can all be found at that time, and their fronds being fully matured the height which they attain is shown, and when their size is known the proper place for them in the garden can be determined, and the room they require can be set apart for them.

It is an easy thing to get all the roots, so that they are not difficult to transplant, although, of course, it is better to take as much of a ball of earth with them as possible.

Germanstown, Pa.

Joseph Meehan.

Correspondence.

Diseases of the Snowberry.

To the Editor of GARDEN AND FOREST:

Sir,—Early in June last I observed on the leaves of my Snowberry-bushes, *Symphoricarpus racemosus*, a mildew which was accompanied by a black spot, affecting a portion and sometimes the entire leaf. As the fruit began to develop I noted black spots showing on the berries, and by the first of September it was impossible to find a perfect fruit, and these, with the diseased foliage, gave the shrubs a most unsightly look. About a half a mile from these diseased shrubs I had a hundred plants of the same species which were not badly infected, but they all showed symptoms of the disease in a greater or less degree. Will you be kind enough to tell me whether this is a local trouble, or whether it is one generally known? I hope to get a vigorous growth of these plants by using manure and check the disease by spraying with the Bordeaux mixture. Is this good practice?

Huntingdon Valley, N. Y.

L. F. Horner.

[It is impossible to decide just what malady it is that has affected Mr. Horner's shrubs without examination of specimens. Dr. Halsted, to whom the inquiry was sent, states that there is a mildew, *Microsphaera Symphoricarpi*, which was described by Mr. E. L. Howe, of Yonkers, New York, in the fifth volume of the *Torrey Bulletin*, page 3; and manuals upon Fungi show that this mildew is not unknown in various parts of our country. It also affects other species of this genus, for Dr. Burrill records it upon *Symphoricarpus vulgaris* in Illinois, and Dr. Halsted has seen the same fungus on Snowberries in Pennsylvania. The black spots on the leaves are probably due to another fungus, and there is a leaf-spot, *Phyllosticta*, which infests the Snowberry, but it is a European species and has not been reported in the United States. There is another leaf-spot which is truly American, however, a *Septoria*, and it may be this which is working together with the mildew upon the foliage of Mr. Horner's plants. It is harder to suggest an identification of the disease which spots the fruit. Almost every one has seen specked Snowberries, but Dr. Halsted says that he has never made any study of the nature of this trouble, and it may be caused by any of the fungi mentioned above in connection with the mildew and the leaf-spot. Very probably these enemies can be controlled by spraying with the Bordeaux mixture if it is tried early and continued during the growing season; and since the disease is probably a widely spread one, this hint may be useful to others besides Mr. Horner.—Ed.]

The "Ramie" Fibre Plant.

To the Editor of GARDEN AND FOREST:

Sir,—For a long time this plant has caused a great deal of disappointment to would-be inventors of machinery for the preparation of its fibre for manufacturing. The machine wanted is one that will clear the fibre of gum and separate it into threads. This part of the work is done by hand in India and China, where the laborers are paid an insignificant sum for a day's work. To do it profitably in this country by hand is out of the question. The material which could be cleaned by one person in a day of ten hours would not warrant the payment of more than a few cents as wages, hence the long and tedious work of developing suitable machinery to perform the operation. Mr. S. H. Slaughter, of Los Angeles, California, who has given much study to the cultivation of fibre plants and to the perfecting of machinery for their manufacture into cloth, has been in this city for some months past, endeavoring to enlist Government aid in the establishing of one or more factories to demonstrate to the people the feasibility of properly preparing the fibre. The inventor claims that the principal difficulties in the way of preparing fibre have been overcome, and that all the infant Ramie industry needs is a lift by the Government. People are slow to invest their money in this industry until it is shown by actual working experience that the project is practicable and profitable.

Much has been written concerning the different kinds of Ramie, and all agree that one of the species outstrips all the others in yielding fibre. It is called *Boehmeria nivea*, a plant quite common in gardens all over the south, having been disseminated widely by the Department of Agriculture for several years. It does not possess much beauty, being a tall Nettle-like-leaved herbaceous perennial, attaining a height, under favorable circumstances, of about seven feet. It is a native of China, and will not endure our northern winters unless it has protection. It has been killed outright more than once during the past thirty years in Washington, so that this may be said to be the northern limit of its hardiness. It is seemingly not overparticular as to soil or situation, and in ordinary seasons, when there is an absence of long dry spells, from two to four crops may be expected. In some recent consular reports it is stated that Ramie cannot be raised from seed. This is a mistake, as there are few plants which yield more seed than Ramie, but it takes intelligent care to raise plants by this method, as the seed is exceedingly small and the seedlings are very tiny for some time after germination. The seed cannot be expected to germinate and grow with the same treatment accorded to most farm seeds. They must be sown under cover in some simple kind of glass structure and carefully tended until large enough for the field. Should the establishing of the Ramie industry become an accomplished fact, it may be that the difficulty of raising the plants from seed will deter cultivators from adopting that method of growing it in quantity, and root division may be the most popular method. The fibre is contained in the long straight stems which rise from the roots, and the crop is fit for cutting when the part nearest the root begins to turn brown. After being harvested and denuded of its leaves, the process of decortication, which is a very simple one, is all that is required of the cultivator before delivering the crop to the factory. The decortication process consists of breaking and stripping the woody matter from the fibre, and is done by recently improved machinery which was exhibited at work at the midwinter fair in the west. The uses to which the fibre is put are many and varied; it is made into the heaviest ropes and into cloth for every variety of use. It can be used with silk to produce the most delicate fabrics. The cloth made from the fibre is said to withstand more wear and tear than any other.

Botanic Garden, Washington, D. C.

G. W. Oliver.

Hardy Cacti.

To the Editor of GARDEN AND FOREST:

Sir,—A few interesting native species of Cacti are found along the eastern foothills of the Colorado Rocky Mountains. They well deserve to be considered hardy, as they are frequently subjected to forty or fifty degrees of frost without harm, while the earth is bare of snow, and to the trying conditions of almost daily freezing and thawing throughout the winter. During early spring wet snows follow in close succession and keep the ground saturated at a time when so much moisture might seem unfavorable. However, the plants take advantage of this time to fill themselves with water to last during the blooming and fruiting season.

Three kinds of *Opuntias* are common, *Opuntia fragilis* and *O. Rafinesquii*, which are usually confined to plains bordering the foothills, and *O. Missouriensis*, the most showy sort, and found on high rocky ledges or hillsides.

Echinocereus viridiflorus is the most common of the globular sorts. It is usually known as Rainbow Cactus, on account of the bright-colored spines. It is found both on the hills and adjoining plains. *Mamillaria vivipara* is a very beautiful species, but is rare in this vicinity. The flowers are red or purple, and each of the long tubercles is tipped with a star of long bright-colored spines. *Mamillaria Missouriensis* is a curious sort, nearly flat, the tubercles mostly upright, with a cluster of white spines at the tip of each. The flowers are yellow and are followed by crimson berries. *Echinocactus Simpsoni* is a tuberculated species, seemingly intermediate between *Echinocactus* and *Mamillaria*. It is very showy at all seasons, and especially while in flower. It is also the largest of our globular sorts. It is densely interlaced with brownish purple, or sometimes yellowish spines. The flowers are rose-purple or pink, usually numerous. *E. Simpsoni minor* is a reduced form found in the high mountains of Colorado, and, doubtless, grows at a higher altitude (9,500 feet) than any other Cactus, latitude being considered. This differs much in appearance from the type, and does not lose its distinctive features after the two are grown under similar conditions at a lower altitude.

In the garden all of these may be well grown on a low broad

mound of coarse gravelly soil, well supplied with decomposed vegetable matter, through which small broken stone may be mingled to good advantage. The soil should be deep and with good drainage at the bottom; this is essential, as stagnant moisture at the roots must be avoided. The surface may be mulched lightly with coarse, hard gravel or pebbles, to keep the rain from spattering the plants with dirt. The bed will increase in beauty year by year, and will require but little care after the first season. The winter effect is also pleasing, and this feature alone should add in no small degree to the popularity of our hardy Cacti.

Boulder, Col.

D. M. Andrews.

Early March in West Virginia.

To the Editor of GARDEN AND FOREST:

Sir,—Vegetation has started here unusually early, and every bright morning we are delighted by the new beauty which invests our garden. Under a great Oak in a situation unfavorable to the growth of grass, we have massed hundreds of bulbs of Narcissi, Snowdrops, Scillas, Grape Hyacinths and other sturdy early-flowering sorts, and in the grass in the open lawn we hid away Crocus bulbs last autumn, sure of finding them again when the first warm sunshine came, and now every day we are enjoying fresh surprises which nature has prepared for us overnight. Every morning we find more Tulips above the ground, more Hyacinths in the border, more Daffodils everywhere. The early birds are here, too, song sparrows, with an occasional robin, with a few blackbirds, the forerunners of the large congregation which will soon be holding their conference in the Oaks. Bluebirds are here, and Carolina wrens and redbirds are whistling like eager boys. Leaves are unfolding on the Spiræa bushes, the Hazels are hanging out their catkins, the Chimonanthus bushes are adorned with hundreds of yellow fragrant bells, the grass is green, and, in short, April is here a month ahead of time.

Rose Brake, W. Va.

Danske Dandridge.

More About Choke Cherries.

To the Editor of GARDEN AND FOREST:

Sir,—I have never seen the Choke Cherry in this section of New Jersey, but I have seen a great many in Massachusetts, differing largely in size and quality of fruit; all, however, more decidedly astringent, with one exception. While fishing for trout in a brook which flowed through an extensive meadow I came upon one tree which produced fruit in which I could detect no astringency whatever. This was more than forty years ago, and I did not then appreciate the advantages of selecting and improving our native fruits. I do not know whether this tree is still in existence, or whether I could find it if it is, but it is quite possible similar varieties may exist elsewhere, or might be obtained from extended experiments with seedlings.

Hammonton, N. J.

William F. Bassett.

Recent Publications.

Principles of Plant-culture. Professor E. S. Goff, Professor of Horticulture in the University of Wisconsin. Madison, Wisconsin: Published by the author.

This is an attempt to give students in an elementary form some of the reasons for the ordinary processes of cultivation. It does in reality more than that, and in a chapter on methods of manipulation it explains with some detail the practice of propagating, transplanting and pruning plants, but even here the reasons for each step are carefully presented, so that the work can be done intelligently. As the book is intended for students who have little or no previous instruction in botany, no space or effort is devoted to advanced scientific problems, but, as far as it goes, the little treatise presents to the reader or student a view which is thoroughly scientific—that is, the science of plant-culture is primarily treated, and treated as the basis of the art. Of course, a brief work like this accomplishes its highest purpose only when it is used in class work under the guidance of a trained instructor. An appendix sets forth an outline of the laboratory work which has been used by Professor Goff with his students, and although this contains only half a dozen pages, and is meant to do nothing more than suggest what can be accomplished in this line, nevertheless it clearly indi-

cates that one who has the requisite knowledge and who is apt to teach, can make this study a most interesting one. Experiments, here only hinted at, suffice to show how the mere statements of the book can be vitalized so that they have a living and practical significance. We do not mean that the book is useless without a skilled teacher, for it can be read with great profit by any young person of ordinary intelligence who wishes to familiarize himself with the so-called laws which underlie farm and garden practice, and this syllabus of laboratory work will suggest a good many ways in which he can illustrate the teachings of the book for himself. Of course, to carry out effectively the kind of instruction we refer to, some glass structure is almost indispensable, but a great deal can be done in a sunny window, and we see no reason why a book like this could not be used in certain classes of our public schools, since the only apparatus actually needed would be a few bottles of clear glass, some graduated glass cylinders, a magnifying lens of good power, with needles and forceps and a few greenhouse pots and saucers. Any teacher who knows something of structural botany could lead his class into most interesting fields, and, indeed, a study of the principles of plant-culture could in this way be made the best practical illustration of the science of botany. In an elementary treatise like this it is very difficult to know what topics to neglect, but Professor Goff seems to have been very judicious, both in selecting and omitting. After an introduction, in which a few of the terms which most frequently occur in the treatise are defined, the circuit of plant-life is traced from the first swelling of the seed, through the development of the embryo, the penetration of the root into the damp soil, the absorption, distribution and assimilation of food, until the plant is built up to maturity, and ceases work and rests through the winter. This includes in a brief way all the processes of plant-life as they are carried on in congenial surroundings, and they suggest methods of making and preserving a favorable environment by proper cultivation. But, since the practical cultivator constantly meets adverse conditions, this is followed by a most interesting discussion of the ways in which the plant is affected by unfavorable environment, by a temperature too low or too high, by excessive or insufficient water, by too much or too little light, by an improper food supply and by parasites and weeds. After this are chapters on plant manipulation, and some brief hints on plant-breeding. Future editions will undoubtedly show that the book can be improved, but certainly the plan on which it is conceived is admirable, and no treatise of a like scope that has come under our observation has been carried out with greater success. It ought to prove an efficient help to beginners in agriculture and horticulture, since, if thoroughly mastered, it will insure an intelligent basis for further study.

Notes.

In his address before the Western New York Horticultural Society, President Barry spoke in high praise of the Jonathan as a winter apple, and a recent issue of *The Country Gentleman* speaks of it as superior in every respect to the Baldwin, and rivaled by few varieties in beauty, flavor or shipping qualities. Its slender growth seems to be an objection to the tree with many cultivators, so that nurserymen have not commended it as they might have done. But it succeeds in a wide variety of localities and it ought to be an excellent apple for the foreign trade.

A correspondent of the *American Florist* writes that the Messrs. Ellwanger & Barry have once more demonstrated that the Crimson Rambler Rose is admirably adapted for winter flowering. Strong two-year-old plants taken up from the field in autumn and potted in seven-inch pots filled with ordinary Rose soil, were full of bloom in mid-February. Many of the flower-clusters were more than six inches through, and their gay colors, with the healthy foliage, made a beautiful show. The plants were pruned back severely before potting, and the young growth pushed out from every eye. The new branches are only from ten to eighteen inches long, stiff

enough to carry the numerous flowers, but arching sufficiently to give the plant a graceful appearance. Ordinary plants carry about a dozen clusters, and they form nice bushy specimens from eighteen to twenty-four inches high and something like eighteen inches in diameter, although they were grown somewhat closely together on a bench and received no extra care.

A writer in the *Orchid Review* states that for half a dozen years he has treated his plants with ammoniacal vapor, which has increased their vigor and improved the color of the leaves of all species of Orchids. This vapor bath has been administered on Monday and Thursday nights every week after the houses have been damped down and the ventilators tightly closed. Soot and lime are used to produce the ammonia, but they are not used dry, since it has been found that there is much less danger of injury to the leaves by the use of a liquid solution which can be spread more evenly and which gives off its ammonia more slowly. A bucketful of soot and half a bucketful of lime are put into a tub with twelve gallons of water, and after being thoroughly mixed the liquid is allowed to stand for three days, when it is ready for use. No care is taken to use the clear liquid alone, but the mixture, thick and thin, is spread over the cindered stages of the houses at the rate of three gallons to a house containing 4,000 cubic feet of air space. The tub is then refilled with water, soot and lime, so that the mixture is always ready in three or four days when needed again.

Every one knows that when seed potatoes are allowed to sprout and the sprouts are broken off, as they often are when the potatoes are kept in a dark cellar, the tuber is perceptibly weakened, the yield lessened and the ripening retarded. The best way to keep seed potatoes is in cold storage, and when thus kept at the Ohio Station they came out sound and fresh, with no sprouts and with unimpaired vitality, even as late as the first of June. It is important, however, that the temperature should never fall below thirty-five, nor should it rise much above forty degrees. In a press circular sent out by the Ohio Station it is advised that the seed potatoes should be shoveled over frequently, as this prevents sprouting to a certain extent where cold storage is not available. Planters are reminded, however, that under certain conditions this sprouting process may be used to advance the early ripening of the crop. If the tubers are placed stem end down in single layers in shallow trays in a light and moderately warm room they will send out short stubby green sprouts which will remain in that condition for weeks, and if the potatoes are then planted without breaking the sprouts they will start immediately.

In one of the suburbs of Dayton, Ohio, an association has been formed for the purpose of beautifying the streets, the unimproved property and the public grounds by proper planting, by promoting a general interest in gardening, and by systematic efforts to abate nuisances and to control the location of houses so far as possible. Lectures are given, with views, to show how house surroundings can be made attractive, and the newspaper reports say that this part of Dayton has shown marked improvement in its appearance. Prizes are offered by the association for the best example of planting in individual grounds, together with the condition of the roadways, gutters, curbs, sidewalks and general appearance of the houses. Prizes are also offered to boys for the best vegetable gardens, as well as prizes open to boys and girls for the best kept back yards, whether planted with flowers, shrubbery, climbers or grass. Photographs are to be taken of the examined gardens, with particular sections and decorations of the streets entered in competition, and a neat pamphlet has been published containing views of the prize-winning grounds last year, and also embodying good advice about trees, shrubs and climbers, with the methods of planting and caring for them.

One of the useful botanical discoveries made by our experiment stations is that which traced the source of the potato scab to an infinitesimal germ that feeds on the surface of the tuber, and from this broadening of our scientific knowledge came the practical advice to use corrosive sublimate, which would kill the fungi on the tubers without injuring their growth. The remedy was so cheap and easy that many large growers have adopted this treatment as a regular part of their farm economy, but the poisonous nature of this fungicide has prevented its general use. Dr. J. C. Arthur, of the Purdue University Experiment Station therefore confers an added benefit upon farmers by the announcement that the new anti-septic known as formalin, which is not very expensive, and which is likely to become cheaper as it is better known,

makes an efficient remedy for the potato scab, while it is not poisonous. Eight ounces of formalin are added to fifteen gallons of water. The seed potatoes are soaked in the solution for two hours, and then they are cut and planted as usual. Since formalin is not corrosive, it can be used in any kind of vessel, and not being poisonous no particular caution needs to be observed, except that it will make the hands smart where there are any abrasions of the skin and its fumes irritate the eyes and throat. Further information about formalin and its uses as a fungicide are promised in a bulletin which will be issued by the station in a short time.

In a letter to *The Fruitman's Guide*, of this city, from a London wholesale dealer in fruits and vegetables, an interesting variety of products is noted in that market in the latter part of February. Baldwin, Greening, Russet and Golden Russet apples came from New York and Maine, and in addition Nova Scotia was sending Northern Spies, Cranberry Pippins and Nonpareils, with Newtown Pippins from California, besides apples from France. The supply of Easter Beurre pears was from California, and Italy also furnished varieties of the same fruit, while new crop Bartlett pears, known in the English markets as Williams, were coming from the Cape of Good Hope. Packages of a dozen of the latter fruits, of exceptionally fine quality, sold at wholesale at \$2.25 a package. As we stated a fortnight ago, peaches were being received from the Cape of Good Hope, during the summer season of that southern country, and new crop grapes. The demand for oranges was supplied by consignments of this fruit from Spain, Palestine, Italy and California. Tangerines, lemons and bananas were in regular supply, and 18,544 pineapples came from the Azores during the current week, from thirty-seven cents to \$1.00 being realized for each of the fruits in wholesale lots. New potatoes came from Egypt, Algiers and the Canary Islands, and new asparagus from Spain and France. The choice variety locally known as French Giant sold at the extremely high price of \$3.00 to \$5.00 a bundle, and slender green stalks, about thirty-two to a bundle, for \$1.00 to \$1.37, while twenty stalks of this vegetable from Spain brought from fifty to sixty-two cents. New cauliflower was provided by Italy, France and the west of England, and there were, besides, abundant supplies of turnip tops and other greens at moderate prices.

Last year the Agricultural Experiment Station of Rhode Island made systematic tests with garden seeds to ascertain their germinating power. Of 233 samples twenty contained three or more poor seeds for every good one, and of twenty-three others more than half of the seeds would not sprout. In continuing the examination 150 more samples have been studied, and the vitality of thirty-four of these last fell below fifty per cent., which means that a purchaser of seeds would receive in most cases less than half of his money's worth in seeds that would grow. The results vary astonishingly. In some of the samples less than ten per cent. of the seed germinated, while in others more than ninety per cent. were good. If there were any uniformity in the percentage of good seed a gardener might know how thickly to sow it, since too many plants in a given space are as disastrous to a crop as too few, but no one can guess how many onion seeds he ought to sow when twelve per cent. in one sample grow, and eighty-six per cent. in another sample. In twenty-three cases seeds bought from the same dealer show a lower vitality this year than they did last, which suggests the possibility that some of this year's seed may have been taken from last year's stock which was held over. At all events, the results indicate that too much ought not to be taken for granted concerning the vitality of seeds, especially when they have been carelessly stored for months. A man who plants bad seed not only loses the money he pays for it, but he loses the use of his land, the fertilizers and the labor wasted in trying to obtain a crop which he never grows. This bulletin well adds that with the struggle now going on to keep the cost of production below the market value of crops the vitality of seeds becomes an important question. Seed of low vitality tends to curtail the yield of a crop, not only because the entire area of the land is not utilized by it, but because it takes crops from such seed, in many cases, longer to mature on account of the lack of vigor in the young plant, and these two considerations so influence the receipts from a crop that it may not be sufficient to meet the expenses of growing it. The purchaser, therefore, ought to have some assurance that his seed is fresh and that it is properly kept, and the only way that such a guarantee can be had is in some agreement between the buyer and the seller by which the latter will regularly test his seed in bulk and furnish each purchaser with a truthful statement of the result of the test.

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Congress and the Forest Reservations.

TWO weeks ago we described in these columns the thirteen forest reservations established on the 22d of February by President Cleveland on the recommendation of a Commission appointed by the President of the National Academy of Sciences, which has been studying the western forests during the past year. Late Sunday night, February 28th, the Senate of the United States, on motion of Mr. Clark, of Wyoming, proposed the following amendment to the Civil Sundry bill, one of the great appropriation bills then under discussion: "And all the lands in the states of Wyoming, Utah, Colorado, Montana, Washington, Idaho and South Dakota set apart and reserved by Executive orders and proclamations of February 22d, 1897, are hereby restored to the public domain, and subject to settlement, occupancy and entry under the land laws of the United States, the same as if said Executive orders and proclamations had not been made." The two reservations in California were not included in this amendment at the request, as we have been informed, of the senators of that state. Possibly Colorado may have been written instead of California, as no reservations have been established by President Cleveland in the former state.

The Senate, deceived by the false statements of the representatives of western mining and lumber companies who became the champions of this amendment, passed it without hearing a single word of protest. The following day the Chairman of the House Committee on Public Lands prepared an amendment to the Senate amendment providing that the Secretary of the Interior be authorized to make sales of timber on any forest reservation, now or hereafter proclaimed, for mining and domestic purposes, and to make all needful rules and regulations for their management and protection; opening all the forest reservations to the location of mining claims, authorizing the opening to settlement of all lands in the reservation more valuable for agricultural purposes than for forest uses, after inspection by a person appointed or detailed for that purpose by the Secretary of the Interior, actual restoration, however, being made only after due publication or by proclamation of restoration by the President based upon the recommendation of the Secretary of the Interior; giving to prospectors

and mineral claimants free access to all forest reservations for the purpose of prospecting, locating and developing mineral resources, and according them the right to acquire titles to mineral lands in the same manner as for other mineral lands in the United States. The President is further authorized in this remarkable amendment to modify at any time any executive order that has been or may be made establishing any forest reservation for the purpose of reducing its area or changing its boundary lines, and is authorized to vacate altogether any order creating such a reserve. This amendment, which was introduced into the House Tuesday afternoon, March 2d, was carried by a large majority, no one opposing it but the representatives of two or three of the western states in which reserves are located, who favored the adoption of the Senate amendment.

The House amendment, on the whole, was more to be dreaded than the proposition of the Senate to annul the proclamations of February 22d, because it meant the ruin not only of the new reserves, but of the seventeen million acres of forest preserved by earlier proclamations. It empowered the Secretary to protect and utilize the reservations and to sell timber from them and to open them to the location of mining claims. No appropriation of money, however, was made to enable him to protect and manage the reserves, although he was permitted to use for this purpose, at his discretion, any part of the \$90,000 appropriated for the general care of the forested portions of the public domain. This appropriation is notoriously too small for the purpose for which it was originally intended, and it is evident that no part of it could be spared for additional protection to the reservations. The Secretary was authorized to sell timber from the reservations, but there are no agents in his department who have the technical knowledge and training needed to manage this business, and until a responsible forest organization in the Interior Department can be got into working order the rights of the Secretary of the Interior to invade the reservations should be carefully limited.

Nor is it safe with the present methods and organization of the Interior Department, and the existing lack of knowledge of the topography of the reservations, to trust any ordinary civil agent of the department to decide what part of the reserved lands shall be thrown open to entry. The actual taking of the land from the reservations is to be done by the President or Secretary of the Interior, but this action must necessarily depend entirely on the report of some subordinate who will be subjected to temptations which the agents of the great western mining and lumber-making companies know only too well how to make effective to modify the independent judgment of Government officials; and it is safe to predict that the enactment of such an amendment would, in the course of twenty years, strip the reservations of their most valuable forests on the plea that the land which produced them was valuable for agriculture. More dangerous even is the authority giving to prospectors and mineral claimants free access into the reserves without any control of any sort by anybody. The first thing a prospector does when he enters a wooded country to look for minerals is to set fire to the woods in order to expose the rocks, and the denser and more valuable the forests the more anxious he is to burn them off. A large proportion of the forest fires in the west are set for this purpose, and hundreds of thousands of acres of forest land have been ruined by prospectors, the smoke of whose fires obscured the sun for months last summer in the Kootenay mining region of northern Washington and southern British Columbia.

In final conference both the Senate and the House of Representatives receded from their positions, and when the Civil Sundry bill finally reached the President it contained only the following amendment concerning the forest reservations:

"The President is hereby authorized at any time to modify any executive order that has been or may hereafter

be made establishing any forest reserve, and by such modification may reduce the area or change the boundary lines of such reserve, or may vacate altogether any order creating such reserve." This amendment would probably have proved harmless, for the President has already this right, although this fact has been disputed.

The bill with this amendment did not receive the President's signature, so that the status of the reservations is exactly the same as it was before the passage of the Senate amendment on the 28th of February.

It is a proposition which admits of no argument, that the forest reservations cannot be used exclusively for any particular class of the community; they belong as much to the east and to the south as they do to the west. They are part of the public domain, and it is for the interest of the whole country that they should belong to the nation. But these reservations must be managed so that they shall continue to preserve the flow of rivers protected by their forests; their trees must be cut to supply lumber, fuel and fencing material; mineral deposits must be sought for and mined within their boundaries; and all land really valuable for agriculture must be taken from them and opened to settlement. Unless the reservations can be made to play their part in the best permanent development of the country, there is no justification for their existence, and sooner or later they must be abandoned. But there is now no organization under the Government which can be trusted to make rules for the wise management and development of the reservations, or which can carry out such rules after they are made, and until Congress authorizes the establishment of a national forest service and the Secretary of the Interior can organize it, the reservations should be strictly guarded against invasion of every kind, unless the country is prepared to witness the destruction of one of its most valuable possessions.

There is great danger, however, that another attack will be made on them in the extraordinary session of Congress which met on Monday, but the protests which have been raised in the press all over the country against the action of the Senate show that a new attack, made on them by men who seem to believe that the national domain is their private property, to be used in any way that will fill their pockets fastest, will meet with serious opposition.

We cannot deny the gravity of the situation. Many men honestly believe that these great reservations are unnecessary; they will certainly be opposed by every man in the states where they are located who wants to cut timber on the public domain without paying for it, or desires to secure a title to Government timber-land. Every miner who wants to burn over the country to facilitate his prospecting, or wants to timber his mine at the cost of the nation, and every sheep man who wants to pasture his herds on the public domain, to which all sheep men now seem to believe they have acquired a vested right, will oppose forest protection in every way in their power. These men are noisy, active and well organized; they have great influence in Congress, where their claims will be loudly and persistently pressed, and only the expression of the calm judgment of the country can save the situation.

Ceanothus in the Landscape of the Sierra Nevada.

THE greatest charm of the landscape in the lowest foothills of the Sierra Nevada is the "Mountain Heliotrope," the *Ceanothus tomentosus*, Parry, in flower on May-day. It is interspersed with the all-covering *Adenostoma fasciculatum*, or *Chemisal*, and seems to gain additional charm through association with *Baccharis consanguinea* with its bright green and varnished foliage. It is but seldom that we find a shrub of this Mountain Heliotrope which has developed naturally. Like the trees in the forest, it is crowded, and the sparingly foliated limbs have to reach light as best they may and secure room for its sun-loving bloom. In all my rambles I have never

found a shrub showing other than rich blue flowers, although there is a variety with flowers of a clear and pure white.

The term "Chaparral" is often applied to the shrubbery on our hillsides, no matter whether such is composed of *Manzanita* or any other growth, but by the people who live here it is applied to only one *Ceanothus*, and that is *C. cuneatus*, the pest of uncultivated land. It ranges from 750 feet elevation up to 2,500 feet, but will occasionally creep into higher zones, provided warm currents favor its growth. It is, therefore, a companion of *Pinus Sabiniana*, the Nut Pine. A common but erroneous belief is that it grows on good land only. Such is not the case. It will grow on rocky as well as deep soil, provided only that it gets plenty of sunshine. It will clothe hillsides for miles and give them the grayish Nile-green tint which they always present to the distant beholder. At the time of flowering, in the last week of March, this color changes and the whole seems cream-white from the millions of minute flowers which they produce on the extremity of every limb. The inside of these much-branching low-limbed shrubs appears dead and has been well compared to a bundle of strands of barbed wire. Seedlings grow up by the million, and all appear equal and well fit to struggle for existence with their neighbors. Wherever man has done any cultivating, cleared an old woodroad, cut a trail, plowed a furrow in years past or still keeps cultivating it, the Chaparral follows him, like the Nettle or Chickweed.

At the mean height of this Mountain Heliotrope belt, about 1,500 feet, we find a new species, a charming shrub, *Ceanothus Californicus*, Kell (*C. integerrimus*, H. & A.) More tender in appearance as well as in texture, it also chooses a more lovely companion in its zone, the bright green *Libocedrus*. People call it Deerbrush, as it offers good browse for the deer when such are driven down by heavy snowfalls in higher altitudes. As pasture is poor all through the Sierras, cattle partly live on Deerbrush, and it withstands well such abuse. While ten feet is the average height for this shrub, I have seen trunks of old, well-protected specimens with a diameter of eight inches. The foliage is very dark green, even when tender and new, and the limbs add greatly to the color, as they remain green for years, and then only turn silvery gray. Their large trusses of slightly cream-colored flowers caused the name of Lilac to be given to them, and we find these plants even in the gardens about the mountain homes in spite of the tendency to seek foreign shrubs and flowers. The blooming period of this so-called Lilac is very long; in fact, it has two distinct periods. The beginning of May sees the first bloom open, and as late as October and even November their flowers may be gathered. These are developed on shoots which lengthen the summer growth, and often on branches bearing many seeds ripe enough to drop out. This plant prefers northern slopes of creeks and gullies, and blooms best wherever the sun gives it most light. The texture of the leaves is thick, and they are evergreen like the other species mentioned. If growing in thickets, as it does very often, it has straggly limbs, like any other *Ceanothus*, yet under free development it is a very effective shrub and lends character to miles of riverside slopes.

The earliness of its bloom and the lowness of its occurrence bring this species in contact with the blue bloom of the Mountain Heliotrope, and I remember, with renewed pleasure, the surprise and delight I had when coming across a very beautiful hybrid between these two species. I found it near Clinton, on the rough banks of a mined-out region, almost deserted, though once populated by thousands of miners. This hybrid proved in every detail that the mixing of blood is almost always productive of a development of the characters of both parents. The trusses were far larger, taking this characteristic from *C. Californicus*, while they were more conical, a trait derived from *C. tomentosus*. Their color was a tender lavender, clear and pleasing. The shrub was more robust than *C. tomentosus*, and yet not so thickly branched as *C. Californicus*.

nicus. As it stood, unhampered by other shrubs, it was a perfect specimen, well worth an honored place in our arboreta. I have not found it since, and could not procure any seed at the time.

As we climb upward in our exploration after *Ceanothus* in the Sierra, and follow the road of the stockmen, who drive thousands of cattle and sheep to the tender grass of the highest altitudes, we notice a low shrub in the way which has apparently survived the trampling of the herds. It is also a *Ceanothus*, rather two of them, and both lying close to the ground, spreading like a trailing vine, slow of growth, and reaching but about three inches in height at the centre of growth. I never saw either in flower, their blooming season being early in April, when the roads at this height of 4,500 feet are impassable for wagons and too distant to reach on horseback. One species, *C. prostratus*, Benth., is an exact counterfeit of *C. cuneatus*, of the same pale green, twisted in wood and thorny to the touch. The other, *C. diversifolius*, Kell., is the counterpart to *C. tomentosus*, its foliage soft and its limbs green like those of *C. Californicus*. They trail along and cover the ground where neither grass nor flower appears on mountain-ridges, and make room only for the all-covering Mountain Misery, *Chamaebatia foliolosa*, on lower ridges, where more moisture and thicker shelter favors the growth of the latter.

The last *Ceanothus*, *C. cordulatus*, Kell., we find just as we leave the region of the Sugar Pine. The herder thinks about snow at the time he sets out with his herd for climbing the mountains in early June and sees it over yonder, where he is aiming. He looks close at hand upon low, spreading shrubs all white with bloom, set in a thicket of spines, clothed with pale green leaves, and this *Ceanothus* he naturally calls Snow-brush. These shrubs, the bark of which remains Nile-green almost all the year, develop in a very regular bell-shaped form where they have any chance, but they are usually pressed down by the heavy snowfall for many months in the year. They resemble *C. cuneatus* in their make-up, and like it they will cover every inch of a hillside if open spots with fairly good soil are reached, decaying lava giving them a favored ground. I well remember the trial I once had when struggling through their matted thorns in search of *Lilium Washingtonianum*, which grows among them, standing like the candles on an altar above the green cover spread for them. This Snow-brush grows at an altitude of from 5,000 to 6,000 feet, just where the cattlemen reach a ridge which offers them no feed at all. The sheep ruin everything in the way of growth, and this thorny, impenetrable Snow-brush protects the only flowers we find in that region. The white Lily is rivaled by the beautiful spike of *Epilobium angustifolium*, and in well-defended shelters we gather the bright *Erysimum asperum*, and the only grass which escapes the ravaging sheep, the pretty *Sporobolus gracillimus*.

Berkeley, Calif.

George Hansen.

Conifers on the Grounds of the Kansas Agricultural College.—IV.

THE SPRUCES.

THE Douglas Spruce, *Pseudotsuga taxifolia*, has not been planted in great numbers; but specimens are to be found in many different locations about the grounds, and it seems to thrive in all. The starting of the trees is attended with some little difficulty, but, once established, it has uniformly done well, and I doubt if, on the whole, it is much more tender than some of the Pines which have the name of exceeding it in hardness. Certain it is that three Douglas Spruces, moved in January, 1896, leaving a large ball of earth attached to the roots; and set near Science Hall, have all lived and are growing well, while out of six Scotch Pines moved at the same time to the same location and treated in the same way, two have died. Similar good results have attended the moving of the Douglas Spruce to other parts of the grounds in other years, though care has

always been exercised that the trees should be set in the best manure possible and that the roots should not become dry, a thing which seems to be more prejudicial to conifers than deciduous trees.

All the Douglas Spruces on the grounds are from two lots set in nursery rows in the springs of 1887 and 1888, being then about 16 inches in height. Since then most of them have been moved to different parts of the grounds, but eleven trees still stand in the old nursery rows, and these average as follows: Height, 9 feet; diameter at the ground, 3.92 inches; at 1 foot, 3.3 inches, and at 2 feet, 2.8 inches. The largest tree of the lot is 11½ feet tall, with a diameter of 5¾ inches at the ground. It will be remembered that the tallest Scotch Pine of the lot planted in 1891 measured 11 feet in height, so that, counting the trees the same age at setting, the Scotch Pine has made practically the same growth in five years that the Douglas Spruce has in seven years. When we remember that the Scotch Pine is one of the most rapid-growing of the conifers, this is not a bad showing for the Douglas Spruce, and certainly it ought to be planted if only for its beauty.

As beautiful as the last-named tree, almost more beautiful, is the Colorado Blue Spruce, *Picea pungens*. It has been planted to about the same extent in the grounds, and is rather more hardy, though of slower growth. Specimens with foliage of the pronounced glaucous shade form only a small percentage of the seedlings, but the trees are always handsome, and some persons prefer the darker shades ordinarily considered less desirable. The characteristic beauty of the tree is but little affected by drought or winter, and, once established, it seems to thrive in the worst seasons of this section of the state. Twelve trees set in the nursery rows in 1888, being then about 12 inches high, and allowed to remain there, now average 5½ feet in height, 3½ inches in diameter at the ground and 1.96 inches at 2 feet. The tallest tree is 7 feet. A single tree set in 1887 in a similar location now measures 8½ feet high, with a diameter at the ground of 3¾ inches, and at 1 foot about 3⅛ inches.

The White and Norway Spruces, though not very generally planted, have shown many desirable qualities. The White especially has done very well, transplanting easily and thriving in almost any location about the grounds. The tendency which the Norway has to become ragged as it gets older, especially if crowded in the least, is rather a serious objection to it, and it is not so handsome a tree as the White, even when well grown, though they are similar in many respects. The Norway, moreover, is much more susceptible to unfavorable climatic conditions. It is the more rapid grower of the two, a growth of twelve to eighteen inches from the terminal shoot not being uncommon in favorable locations and among trees that are well established, while in the White the terminal growth will range from six to ten or twelve inches under similar conditions. Most of the specimens on the grounds are too young for their measurements to be of interest, but a single specimen of the White Spruce, now about twenty years old, measures as follows: Height, 27½ feet; diameter at the ground, 10 inches; at 2 feet, 8½ inches, and at 6 feet, 7½ inches.

Agricultural College, Manhattan, Kansas.

F. C. Sears.

The Arrangement of Flowers.—III.

THOSE SUITABLE FOR BOWLS.

ONE of the principal ways of arranging flowers is in bowls, and this is particularly suitable for many garden and wild flowers, such as azalea, scarlet sage, sweet clover and daisies. It is the easiest arrangement, and the only one in which it is possible to use handfuls of flowers at once. But this lazy method has its limitations. In a mass of *Azalea nudiflora*, for instance, it is better that one section should be of the darkest blossoms. They grow in this way, one bush all of deep pink flowers, while the next is covered with those of lighter color. Dis-

posed in this way in masses of distinct tones the collection will have a beautiful shaded effect.

It is well to place some smaller vases inside the bowl, as a finger-bowl, and inside of that again an ordinary glass. This enables one to place the flowers exactly where it is wished to have them, and they are also kept in place. As autumn advances, more vivid coloring is everywhere seen in plant-life. We lose from the garden such flowers as the pale forget-me-not and garden pink, *Dianthus plumarius*, and red and yellow flowers predominate, as though Nature wished to give us her most brilliant colors before reducing us to the sombre tints of winter. Huge bunches of golden-rod and sunflowers, *gaillardia* and *coreopsis*, are appropriately used to decorate the halls, and great clusters of bright red crab-apples brought in from the orchard, while the dining-table is decorated with a mass of showy *Phlox Drummondii*. There are many yellow flowers, as *gaillardia*, *coreopsis* and *calendula*, which combine effectively with other colors. The double yellow *calendula*, for example, shades from pale to deeper and unusual tints. These flowers look particularly well combined with bright blue corn-flowers, *Centaurea cyanus*; brighter yellow flowers would be too vivid for the blue, but this combination seems to suit the *calendulas*. *Gaillardias*, with their deep red centres, show to good advantage combined with deep red flowers, such as those of *Monarda didyma*, and the yellow petals are thus brought into good relief. Red and yellow well combined make a beautiful effect. Nature teaches us this in all her autumn coloring, and it seems reasonable to adopt the same combination for cut flowers also.

Among the flowers which are suitable for arrangement in bowls none are more difficult to dispose pleasingly than *nasturtiums*, and it is easy to make them look stiff. The ordinary bowl is useless for them, as the stems are short. The leaves wilt quickly, and altogether these richly colored flowers are most satisfactory when in the garden. *Baby's Breath*, *Gypsophila paniculata*, has an insignificant, fine little white flower that can hardly be called pretty and has almost no perceptible odor, but it is indispensable. These flowers are carried on almost invisible needle-like stems, and with a spray or two of this in a vase the long-stemmed flowers will stand in exactly the position that is wished, and a delicate feathery effect is given to the arrangement. The foliage is a soft shade of green. The tiny white blossoms are beautiful as a part of the combination, or a small spray may be used in the centre of the bowl to hold the flowers erect and not show at all in the finished arrangement. With *nasturtiums* it is especially useful. It should be placed in the bowl first, and the *nasturtiums* added on the shaded scheme of first a cluster of dark flowers and then of a harmonizing tint, until the effect is a gorgeous rainbow coloring and not at all of a patch-work.

To sum up, in arranging flowers they should be made to look as much as possible as they do in nature. Tall flowers should be arranged in tall vases and short flowers in shallow ones; dainty flowers in a delicate way, and the more solid ones in masses; and the effect should always be to bring the flowers into prominence, and not the vase.

Rangeley, Me.

Dorothy Root.

New or Little-known Plants.

Cornus asperifolia.

THIS shrub of the western and southern United States appears to be rare in gardens, although it has been cultivated for a dozen years in the Arnold Arboretum, where it has proved perfectly hardy and one of the most distinct and desirable of the American *Cornells*. *Cornus asperifolia* is a shrub with erect stems, sometimes attaining a height of fifteen feet, reddish brown and mostly pubescent branches, slender rough-pubescent branchlets, ovate or oblong leaves, acuminate, with long or short points, scabrous above and whitish and soft-pubescent below;

white flowers in ample, open, flat cymes, and white fruit borne on bright red pedicels. *Cornus asperifolia* is distributed from the northern shores of Lake Erie to Minnesota and Nebraska, and southward to South Carolina, Florida and Texas, but is most abundant in the states west of the Mississippi River.

The figure on page 105 of this issue, which we believe is the first portrait of this plant which has been published, is the reproduction of a drawing made by Mr. Faxon from a plant cultivated in the Arnold Arboretum.

Cultural Department.

Early Spring Flowers.

MR. WATSON'S letter of last week reminds me to report on the flowers of this debatable season, which is not winter and less than spring. One never tires of the dainty beauty and fragrance of the *Snowdrops*, and it is an annual surprise to watch them boldly brave the rigors of the winter. They were formerly associated with the encouraging idea that another season of growth was commencing, but the edge has rather been taken off that sentiment, for we now have *Snowdrops* in the garden from September onwards, and there is no time during the half year when blooms of these may not be found making such progress as the elements may permit. There are quite two-score clumps of *Snowdrops* under various names in my garden. Many of these are well determined and distinct kinds, and many there are whose labels are geographical queries, as they bear names only of unheard-of places where they were collected, mostly by Mr. Whittall, whose loving labors have added so many good kinds to our garden. Most of these strangers prove to be forms of *Galanthus Elwesi*, but one grows them always with the pleasant anticipation that among them will be found some rare gem. If rapidity of increase and perfect adaptability to the usual garden conditions are tests of greatest value, I quite agree with Mr. Watson that *G. nivalis* is the best *Snowdrop*. While small-flowered, it is as pretty as any of the family. It is the only *Snowdrop* in my collection which forms thick clumps of bulbs and increases rapidly in any position. But there is a wealth of variety and distinctness in the family, and mere difficulty of cultivation will scarcely deter one in such a promising field. Mr. Whittall's *Cassaba* variety of *G. Elwesi* is a bold, distinct flower (one of the largest) on strong scapes. The *Aidin* variety scarcely holds to its original promise, but among the bulbs I was fortunate to find a few with trim flowers and some nice colorless forms—that is, nearly white, the usual green of the ovaries and inner segments reflexed with a slight glow of yellow. *G. Ikariae*, with its shining, broad scilla-like leaves, is one of the most distinct *Snowdrops*, but has not made much progress here. The leaves seem more affected by hard conditions than those of the other varieties. Of the boldest or large-flowered *Snowdrops*, perhaps the most satisfactory is *G. nivalis Atkinsii*. The *Melville* variety of the same species is equally bold, but has an unsatisfactory tendency to produce extra petals, destroying the symmetry of the flowers. Mr. Allen's seedling *Charmer* is another beautiful kind with great purity of color.

Of the more common kinds the Italian form of *Galanthus nivalis imperati* is very pleasing, with long pointed buds. This form of bud, which is owing to narrow outer petals, seems to me distinctly more pleasing than the globose forms which one finds among the *G. Elwesi* and in such forms as *G. robustus*. *G. Fosteri* is a highly esteemed kind which has never done well with me, and *G. plicatus*, the Crimean *Snowdrop* with folded leaves, refuses to stay at all. All the *Snowdrops* are handsome, except the double-flowered *G. nivalis* and the odd horned one, *G. Scharlokii*. This has two horn-like growths, produced by splitting of the spathe and the flower, which is short and is blotched with green markings. The *Elwes* *Snowdrops* are now so available at a reasonable rate that they should be planted largely, though they do not always increase very well. Perhaps positions under deciduous trees are the most satisfactory, they naturally growing in such places.

The first *Crocus* of the season is usually the rosy *C. Imperati*, but this is not usually as reliable in the garden as *C. Susianus*, the golden color of which is very acceptable at this bleak season, when high colors are very rare. There are other yellow *Crocuses* in flower now, dainty beauties, but they are nameless.

One of the most satisfactory flowers of the season is the *Taurian Squill*, introduced by Mr. Whittall a few years ago,

Fig. 13.—*Cornus asperifolia*.—See page 104.

1. A branch of a flowering plant, natural size. 2. A branch of a fruiting plant, natural size. 3. A flower, enlarged. 4. A fruit, laid open transversely, enlarged.
5. A stone, enlarged. 6. A winter branchlet, natural size.

and now known as *Scilla Sibirica multiflora*. The natural habit of this flower is so well fixed that it still continues to vie with the Snowdrops for first place. The flowers are brighter in color than the typical *S. Sibirica*, which follows it in flower, and they are very freely produced. A good-sized colony of these plants is about as effective as anything of this season.

All these flowers, though so frail, seem quite happy in the hard conditions under which they have to struggle in an American winter, with its daily changes, which, it is to be hoped, are not as trying to them as to mankind, but my sympathy is always excited toward the early Irises, which often only appear to be buried under the snow. Experience has

shown me, however, that this sympathy is misplaced, for these apparently fragile flowers will brave snow and storms as sturdily as the Snowdrops. *Iris Bakeriana*, quite the prettiest and daintiest of these flowers—in fact, among the choicest of all flowers—has sometimes had its season prolonged in my garden because its flowers were frozen in position so rigidly that they could not change. These little bulbous *Irises* must have care in the garden or they will fail to make strong new bulbs. Professor Foster recommends that they shall be often lifted, which seems sage advice. They are all hardy except *I. Histrio*, which is unreliable, and may or may not survive. It has flowered here, but usually a late freeze after the leaves are well grown will finish it. However, there are others just as good, and there are none of the section which are bad. It is well to grow, say, *I. histrioides*, *I. reticulata cyanea*, *I. Foster*, *I. Krelagii*, *I. Kolpokowskyana*, *I. Danfordiae*, etc. My earliest *Iris* this year was a particularly small form of *I. reticulata* from Harpoot. These *Irises* are easily increased from offsets and seeds, if one has the patience. The seeds will germinate freely in about twelve months from sowing. The seedlings should be kept in the pans till the bulbs are fairly formed, and in another year they will make blooming bulbs.

Grape Hyacinths are also in evidence, the dark purple kind, which is a gloomy flower. Later we shall have the more cheerful *Muscari azureus*, which is a real blue flower, which, with another celestial-blue, *M. Szovitsianus*, and the white variety of *M. botryoides*, seem to be the best of these rather pretty, if dumpy, flowers.

Life is active in the garden, but, aside from these flowers, the only color is found on a few *Cyclamens*, whose red flowers are small, but striking. Altogether these flowers do not make a great impression of color in the prevailing wet desolation of March, when the garden is at its worst.

Elizabeth, N. J.

J. N. Gerard.

Notes on Ferns.

THE regular cleaning and repotting of Ferns should be attended to when the new fronds push up in spring. If potting is done too early there is some risk of the new soil becoming sour in the case of delicate-rooted species, and if this occurs a good start is seldom had. Some of the strong-growing kinds, as some of the *Adiantums*, will bear the removal of all the old foliage before the new growth has started, but, unless the plant is infested with scale or other insects, I prefer to leave the old fronds on the plant, or, at least, all that are in fair condition, until the new growth is fully expanded. A stronger growth is thus secured.

Large specimen plants do not need repotting every season, and a top-dressing in spring and some extra stimulants during the summer are all that is necessary. Elaborate mixtures of compost are not required for the majority of strong-growing Ferns, though necessary for some delicate species. A light, fibrous loam, moderately enriched with dry cow manure is suitable. The house in which the Ferns are grown should be kept closer for a few weeks after repotting, and shaded, for while a reasonable amount of light is required to develop foliage of firm texture, too much sunshine will bleach the Ferns and thus destroy one of their greatest charms—the deep and restful green that is so characteristic of many species.

The watering of the newly potted plants also needs care, for too little is quite as injurious as too much. The main object is to keep the soil in a moist, but not sodden, condition, and thus tempt the tender young roots to further activity.

Adiantum Farleyense sometimes has a reputation for fickleness of growth that this noble Fern does not deserve. The mistake is made of trying to grow it in poor soil, whereas the soil best adapted for this variety is three parts strong turfy loam and one part of fine dry cow manure well mixed through the loam. In such soil, and placed in a shaded house with a temperature of seventy degrees, I have grown *A. Farleyense* from a fair plant in a two and a half inch pot to a good, well-furnished specimen in a ten-inch pan, and with a spread of more than two feet, within one year from the time of the first shift.

The much-advertised so-called Boston Fern, a handsome form of *Nephrolepis exaltata*, also makes remarkable progress in a strong soil, in common with the other strong-growing species of this same genus.

A few cool-house Ferns will give much satisfaction where the facilities are not adequate for a complete collection. The *Gleichenias* are prominent among these, and are worth all the care they need. *G. flabellata*, *G. dicarpa* and *G. dichotoma* are

three of the best types, and can be grown well where a temperature of forty-five degrees is maintained during winter.

Special cultural directions for *Gleichenias* have been given in GARDEN AND FOREST in former years. But it may be well to repeat that well-drained and rather coarse soil is preferable, and pans are preferable to pots, because these plants are largely surface-rooting.

Pteris scaberula and *Hypolepis distans* are readily obtained and are highly satisfactory for the cool house, though both these Ferns are nearly or quite deciduous, according to the conditions under which they are grown. Another charming Fern for the cool house, notwithstanding its deciduous habit, is *Asplenium Goringianum pictum*. The foliage is not only very graceful but prettily variegated. For large specimens *Woodwardia radicans*, *W. orientale* and *Todea barbara* are all excellent, while *Cyrtomium falcatum*, *Camptosorus rhizophyllus*, *Fadyenia prolifera* and some of the many *Polypodiums* add singularity and variety to the collection.

The worst pest to which the cool-house Ferns are liable is the thrip. This insect multiplies with great rapidity during our hot summers, but with proper care as to moisture, both at the root and in the atmosphere, and careful examination of foliage from time to time, serious injury from this cause may be avoided.

Holmesburg, Pa.

W. H. Taplin.

Erythroniums.

I CONFESS myself a lover of *Erythroniums*, or Dog's-tooth Violets. They blossom when flowers are scarce, and the many varieties are in bloom during a long time. *Erythroniums* are unexcelled among early-flowering plants for beautiful foliage and flowers in which grace and delicately beautiful tints are happily combined. The plants are quite hardy, and if their needs are understood are quite easily grown.

Erythroniums are woodland plants and need some shade to develop the leaves and stems. Partial shade by trees will answer. I give my beds a lath shade. I have for several years been experimenting with soils for them. They are woodland plants, and, while often found in heavy soils, make better growth in a soil of rocky debris mixed with mold. Much of the charm of Dog's-tooth Violets is in their large leaves and tall slender stems. Rocky debris has not been available, and I have tried several substitutes. Composts of rotten grass and well-fined manure soon packed. I also experimented with old pine sawdust with good success, but have discarded all for a soil of one-half to one-third half-rotten spent tan-bark with sandy loam. Our tan-bark here is the bark of the Tan-bark Oak, *Quercus densiflora*, and is ground at the tannery. This gives a soil rich in mold and always loose and porous. It suits the needs of *Erythroniums* exactly and answers well for many other bulbs.

Erythroniums should always be planted early. With few exceptions, the bulbs are not good keepers after fall, and the sooner they are in the ground after the first of October the better. I plant them so that the top of the bulb is about two inches from the surface. The drainage should be perfect. With these essentials of shade, drainage and a loose soil, success is very probable. Although quite hardy, a heavy coat of leaves, such as nature protects them with in their woodland home, would probably be a wise precaution in cold climates. They do not seem to have any peculiar disease, and growing and flowering as early as they do, artificial watering is not necessary.

In the region including the Rocky Mountains and the country westward to the Pacific, fifteen forms are now known, classed as species and varieties. A more charming group of bulbous plants does not exist. Their leaves show a variety of mottling, and in the flowers delicate shades of white, straw-color and deep yellow, deep rose, pink, light and deep purple, are represented. To describe all of these forms so that even a thorough botanist could readily identify them by the descriptions, would be difficult, but in the garden each has some charm of leaf, of tint or of form, which endears it to the possessor.

In their native homes they grow throughout a wide range as to climate and altitude, and in cultivation they maintain their seasons, so that the display which is opened by *Erythronium Hartwegii* with the Snowdrops and earliest *Narcissus*, is closed by *E. montanum* and *E. purpurascens* when the others have flowered and become dry.

Erythronium Hartwegii is not only the earliest, but also the most easily grown of all, and unique in its habit. Its leaves are mottled in dark green and dark mahogany-brown. The two to six flowers are each borne on a separate slender scape

and form a sessile umbel. The general effect of a well-grown plant is of a loose bouquet with the two richly mottled leaves as a holder. The segments recurve to the stalk and are light yellow with an orange centre. Well-grown flowers measure two to two and a half inches across. The bulbs of *E. Hartwegii* are short and solid, produce small offsets, and do not dry out as readily as those of other species. Unlike most sorts they retain their vitality until late in the season, and are in good condition in February, when bulbs planted earlier are in flower. More care is required to grow most kinds of *Erythroniums* than the ordinary grower will give, but this species is a flower for every one.

Ukiah, Calif.

Carl Purdy.

Fertilizers for Forced Roses.

AT the last meeting of the Dutchess County Horticultural Society letters were read from experts in various branches of horticulture in reply to questions sent out by the Secretary, and what follows is the answer given by Mr. John N. May to the question, "What is the best formula for a fertilizer for Roses under glass?"

"I understand this to apply to Roses forced for winter flowers, and no one answer can be framed so as to be adapted to all conditions of soil. I must presume that the soil used for growing Roses contains naturally those ingredients which are essential to plant-life, such as fairly good loamy sod does, and this can be obtained in almost every section. If it is very heavy, a little sand will make it porous, and if very light, a little clay should be added. For a soil like this the only addition needed is a fair proportion of well-decomposed manure, and, of course, manure from well-fed stock is the best. If one part of such manure, thoroughly rotted, is added to and thoroughly mixed with five or six parts of decomposed sod, the only fertilizer needed for Roses grown in it is a mulch not more than half an inch thick of well-decomposed manure. This should be put on in the fall, and a similar coat given every eight or nine weeks till the end of the season. When the days begin to lengthen at about the middle of January, and the plants are growing vigorously, they may have a watering of weak liquid-manure made from the droppings of different animals, used alternately, and applied every two weeks, and nothing more in the way of feeding the plants will be needed. Of course, there will be cases where the soil is deficient in some element of plant-food, such as potash or phosphoric acid, and this can only be determined by study and experiment by every grower for himself. The first care should be to find out what is lacking, and the next to supply it in proper proportions. This must be left to the judgment of every man, and although such matters may appear of small consequence, it is these small things which insure the highest success, and it is their neglect which makes the business of the florist and gardener an uncertain quantity. In a general way I may add that I believe more Roses and other plants have been killed and crippled for life by the use of stimulants than by any other one thing. The best of all fertilizers will be injurious if it is applied injudiciously, and the formula that will bring the surest success is plenty of fresh air, cleanliness, plain, wholesome food and practical common sense."

Fishkill-on-Hudson, N. Y.

W. G. G.

Iris Japonica.—This beautiful Iris, which has been in cultivation for nearly a century, ought to be in every collection of cool-greenhouse plants. It belongs to the rhizomatous section of the genus, and is perhaps better known as *I. fimbriata*. The bright green sword-shaped leaves are from one foot to eighteen inches in length, gradually tapering to a point, and are arranged in fan-like tufts, making an elegant plant even when not in bloom. The pale lilac or bluish flowers are three inches in diameter and beautifully fringed. The reflexed falls are a rich orange-yellow at the throat. The individual flowers are fugitive, but they succeed each other until each spathe has produced three or four. The plant blooms better when allowed to become pot-bound. My experience has been that it is best not to attempt to divide the roots until this is absolutely necessary, as the plant will not blossom till the second season after division.

Thunbergia laurifolia.—This lovely warm greenhouse climber, perhaps better known as *Thunbergia Harrisii*, is a most beautiful object when in full bloom. The plant is a strong and rapid grower, with opposite simple leaves, ovate-acuminate in outline, seven inches long by three wide, on short petioles. The beautiful lilac-colored flowers are three inches in diameter, and are borne in axillary and terminal clusters in the greatest profusion, but owing to the extreme delicacy of the petals a shaded position should be chosen for the vine if pos-

sible, as bright sunlight soon causes the flowers to fade. Its season of flowering is from the middle of January to the middle of March.

Botanic Garden, Northampton, Mass.

Edward J. Canning.

Correspondence.

Horticulture in Colleges.

To the Editor of GARDEN AND FOREST:

Sir,—Although not engaged in imparting horticultural instruction in the class-room, my experience having been rather in the line of receiving such instruction, yet I would like to emphasize some of the points brought out by Professors Munson and Waugh on this subject in your journal.

I am aware that in many of the land-grant colleges there is an urgent demand on the part of the farmers for the practical in teachings of horticulture. This is also true of experiment-station work. The situation is in no wise improved when we admit that this demand is made without comprehending those principles which underlie true education. We are bound to help those very people from whom the demand has come, so that for the present, at least, we must include in the college curriculum a certain number of the practical courses, but it would, indeed, be a feeble institution where instruction is given only in that portion of horticulture which could be learned quite as well from any gardener.

I agree with your correspondents that horticulture, in a certain sense, is an advanced study, and perhaps it should not begin earlier than the junior year, provided that the student has already taken such studies as chemistry, systematic, structural and physiological botany and the physics of soils; but if these subjects are to be taught wholly or in part as incidental to the courses in horticulture, two years is too short a period. Botany is one of the most important subjects as a foundation for horticultural study. The botany of cultivated plants receives too little attention in most colleges; it is considered a subject partly or entirely outside the domain of a systematic botanist, so that while the student may acquire a thorough knowledge of the wild plants of his vicinity, he may be able to tell you very little regarding the botany of the cultivated ones. I well remember when my professor in botany in college told me that I would not be able to determine a rose which I had brought from a neighboring garden, because it was a "cultivated form, and not a natural species." He was silent in regard to the origin or possible derivation of any of the "cultivated forms," and I was left to grope my way in darkness, or drop the matter as being wholly outside of science. I have since learned that all cultivated plants are to be referred to some natural genus, and that many forms which have been evolved in the garden are just as much distinct species, so far as any botanical characteristics are concerned, as those forms that we may gather from the forest or hillside, meadow or plain.

Plant propagation is a good subject with which to begin instruction in horticulture. A few lectures may be given with suitable illustrations, and the student can get the rest from Bailey's *Nursery Book* used in connection with laboratory work. I should be inclined to make the compulsory course a short one, however, and put most of the laboratory and manual work on the elective list. The improvement of cultivated plants is of great importance, and in this course may be taught the philosophy, principles, theories and laws relating to the subject. It seems to me that it is in a course of this kind, given in lectures or with the use of text-books properly elaborated by lectures, that the student receives his greatest inspiration and enthusiasm in the cultivation of plants.

Why not give short courses of a few lectures each on plant propagation, pomology, vegetable-gardening, floriculture and greenhouse construction and management, in which are taught the more important principles of the art, and leaving those phases of these subjects which are usually placed in the foreground, such as cultural methods and varieties, to be made the subjects of minor elective courses? Both cultural methods and varieties are constantly changing, and at the same time may be entirely different in different parts of the country. If a student intends to make horticulture his profession he should have instruction in all branches pertaining to it, and all he can get of each, but if horticulture is only added to fill out a more or less general course of training for the purposes of education, it seems far more important to "consider the principles on which the art is founded." It is of far greater moment that a man should be educated than that he be made a fruit grower or a florist.

I wish that landscape-gardening might be placed on the prescribed list. When traveling about the state and observing

how many country houses look bald and barren, how many others seem smothered behind a meaningless and confused mass of trees and shrubs, and how few homegrounds are planted or cared for with any taste, one cannot help feeling how much more beautiful and cheerful rural and village homes would be if every owner had some elementary schooling in the principles of garden art. There is some excuse for requiring landscape-gardening in a general college course; a larger proportion will be influenced by it than by almost any other subject. For instance, the number of people who own homes is far in excess of those who grow fruit or vegetables for market, and why should we not know how to beautify the home as well as how to grow perfect Bartlett pears or Hubbard squashes? Every home which is made a model in the way of arrangement and planting remains for years a living example for thousands of eyes to feast upon, while the pears and squashes pass with the season. I would teach landscape-gardening as a fine art, and quite as worthy of patronage as music or painting. If every civil engineer and architect could receive good fundamental training in landscape-art what a world of natural beauty might then be preserved that is now ruthlessly destroyed!

I will only add that, whatever the curriculum, personal investigation by students should be insisted on, and that in every subject the more important literature should be mentioned and discussed.

Experiment Station, New Haven, Conn.

W. E. Britton.

The Orange Fruit Worm.

To the Editor of GARDEN AND FOREST:

Sir,—This insect, alluded to on p. 91, was described and figured as long ago as August, 1888, in the first volume of *Insect Life*, page 45. It is there called the Morelos Orange Fruit Worm, *Trypeta ludens*. The orange growers of California are much exercised over this insect just now, and they are trying to induce Congress to pass an act establishing a national quarantine. I consider the danger a present one and see no reason why the pest cannot establish itself in our own Orange-growing districts. The maggot will probably flourish wherever the orange can grow, and while under natural conditions it would probably not reach the United States for many years to come, if at all, a dozen infested oranges exposed for sale for sufficient time in southern California might produce flies enough to stock the Orange groves of that region in a very few years.

Rutgers College, N. J.

J. B. Smith.

To the Editor of GARDEN AND FOREST:

Sir,—I am glad to note your remarks on the Orange-worm in your editorial of March 10th. On the Pacific slope of Mexico, the district about Yautepec and Cuautla, in the state of Morelos, is very badly infested. The chances are against finding a sound orange coming from that district, and in the City of Mexico one has to be on his guard against wormy fruit. The prevalence of the pest is, doubtless, largely due to negligence on the part of the orange growers. It is said that the Cordova district, on the Gulf slope, is also infested. I have, however, eaten many excellent oranges from that district, and fruit growers there are said to be more careful in their methods than in the Morelos valley. Two districts which are not infested are that near Lake Chapala, on the line of the Guadalajara division of the Mexican Central Railway, and the Hermosillo district in the state of Sonora, both of which now send large quantities of superb oranges to this country by rail. I am told that the Rio Verde oranges, near the line of the Mexican Central's Tampico division, are also sound.

It would be a calamity to have this pest introduced into the United States. Since the failure of the Florida crop, orange buyers from this country have been buying up all the available crops in Mexico. There is particular danger that, in the scarcity of oranges in Florida, fruit from these districts may be taken there as well as to New Orleans, Galveston and other Gulf ports, where the worms might at once find a favorable field. In the Morelos valley the Mangos are also badly infested by a similar worm, possibly the same species. If introduced to this country, the orange-worm might, perhaps, take a liking to other fruit as well.

It would be unfair to impose a prohibitory tariff on oranges from Mexico as a whole, for the Hermosillo and Lake Chapala districts supply the western sections of this country with fruit at seasons when they do not come into competition with the California oranges, and the Hermosillo crop, at least, is available long before the Florida oranges are fit to eat. But it is the imperative duty of our Government to ascertain all the

infested districts in Mexico and strictly forbid the importation of fruit from those parts.

The Mexican Government should also take rigorous measures against the pest and thus avert serious danger to an important and growing industry in that country. It has been suggested that, if all the wormy fruit that is now left to decay on the ground in the orchards were promptly destroyed, it would certainly reduce the damage from the pest very materially.

Malden, Mass.

Sylvester Baxter.

Meetings of Societies.

National Fruit Growers' Convention.

THE continued spread of the San José scale, the recent introduction of several injurious insects from foreign countries, and the imminent danger of introducing the "Orange fruit worm" from Mexico into the Orange districts of the United States have thoroughly aroused horticulturists and fruit growers generally to the importance of protection against injurious insects. In almost every state, from New York southward and west to the Mississippi or beyond, bills have been introduced or enacted to regulate the distribution of nursery stock so far as it is possible to do so without coming into contact with legal interstate commerce. At almost every meeting of fruit growers, at almost every horticultural society and at almost every meeting of experiment station workers the question of destroying the San José scale or preventing its spread into new localities has been up for discussion. The matter was deemed so important that the Ohio Horticultural Society, at a meeting during the winter, issued a call for a delegate convention to be held at Washington, Friday, March 5th, to consider the possibility or advisability of securing legislation by the National Government in the direction of enforcing a quarantine against the introduction of foreign insects and the regulation of the transportation of nursery stock between the states.

In response to this call a large number of delegates met at Washington, Friday, March 5th. Most of the central states, many of the northern central states, most of the southern states, middle Atlantic states and California were represented at the convention. In some cases a number of delegates attended from a single state representing different societies, and a considerable number of entomologists and horticulturists from the experiment stations were also present. There were a number of attendants who did not figure as delegates, but to whom the privileges of the floor were extended, and altogether there were at times nearly a hundred persons in the room in which the meetings were held. During the morning session several papers were read in which the possibility of regulating or preventing the spread of insects and fungous diseases by law was considered, and in a paper by B. M. Lelong, of California, that state's experience was detailed. Dr. L. O. Howard and Mr. B. T. Galloway, of the United States Department of Agriculture, read papers on insects and fungous diseases, respectively, and made suggestions as to the lines in which legislation was possible. The outcome was the appointment of a legislative committee of ten, in which nurserymen, fruit growers and experiment station workers were represented, to whom was intrusted the duty of preparing an outline of such legislation as was considered advisable. This committee organized immediately, electing Mr. William B. Alwood, of the Virginia Station, as its chairman, and a hearing was had during the afternoon, at which all the members present had an opportunity of giving their views on the subject of what such legislation should consist of. Quite a number of bills had been prepared in advance, embodying the opinions of the writers, and several of these were read to introduce and excite discussion. The sessions were continued until late in the evening and resumed on the morning of the 6th, when the committee finally reported that they had been unable to agree upon any proposed legislation for individual states, but suggested that all acts should contain a provision for the periodical examination of nurseries and fruit farms, and should provide also for power to compel the destruction of dangerously infested stock of all kinds. It was deemed best to deal with the subject of interstate commerce and national quarantine in one bill, and the following was finally agreed upon by all the interests, after it had been discussed section by section.

The importance of this meeting cannot be overestimated. It is the first time that any large body representing not only experiment-station workers, but nurserymen and fruit growers, had met to discuss the subject, and at first it seemed that interests were so diverse that no agreement could be reached.

It was realized, however, during the discussions that reasonable protection only was contemplated by the persons interested, and that, after all, the objects sought to be obtained were for the ultimate benefit of all concerned. Nurserymen and fruit growers were interested on the same side, and finally every section of the bill was adopted without a dissenting vote. The legislative committee was continued, with power to appoint an executive committee, and the officers of the convention, Mr. Cushman, of Ohio, being elected president, were given power to call further meetings in case it proved necessary or desirable.

The title of the proposed bill states that it is an act to provide for inspecting and treating plants, buds, cuttings, nursery stock and fruit imported into the United States or grown within the United States and becoming a subject of interstate commerce. Section 1 authorizes the Secretary of Agriculture, at the expense of the owner of such imported stock, to retain it in quarantine at designated ports, where inspectors appointed by him may examine it to ascertain whether it is affected by any dangerously injurious insect or disease, and provide for its treatment when necessary. Section 2 provides that when such plants, etc., are found infested they shall be treated at the expense of the owner or shall be destroyed when their condition warrants destruction; but an appeal from the inspector's decision may be made to the Secretary of Agriculture within three days after the inspection, and the Secretary's decision shall be final. Section 3 provides that if imported plants, fruit, etc., are apparently free from dangerous infection a certificate to this effect shall be issued to the owners by the inspector, and this certificate shall release the plants from further restriction, either at the port of entry or in interstate commerce. Punishment by fine and imprisonment is provided against counterfeiting, altering or defacing such certificates. Section 4 provides that when the Secretary of Agriculture is convinced that proper inspection and treatment for exported plants are furnished in any foreign country, he may by proclamation accept such inspection and treatment in the place of that performed by his own officers. Section 5 provides for the proper inspection and treatment at the expense of their owners, and before their shipment, of all plants, buds, scions, etc., which are subjects of interstate commerce, and are about to be transported from one state into another. Section 6 provides that this examination shall be made under rules prescribed by the Secretary of Agriculture, and that plants found free from danger and properly certificated may be released from further quarantine and restriction in interstate commerce, and it provides for the punishment of persons who counterfeit or destroy these certificates. Section 7 makes it a misdemeanor to transport from state to state any plants, buds, cuttings, etc., which have not been examined in accordance with Sections 5 and 6, or which have been declared by inspectors to be dangerously affected. Section 8 authorizes the Secretary of Agriculture to accept an inspection by any state, territory, corporation, firm or person which he may consider proper and competent, in lieu of inspection by his own officers.

Recent Publications.

Vegetable-growing in the South for Northern Markets. By P. H. Rolfs, M. Sc., Professor of Horticulture in the Florida State Agricultural College. Richmond: Southern Planter Publishing Co. 1896.

This manual consists of what were originally lectures delivered to classes in horticulture, but in process of revision they have lost their fragmentary character and the book has assumed the form of a systematic treatise. The reader must understand that earliness in the production of vegetable crops for northern markets is a matter of prime importance, so that the directions for cultivation, fertilizing and the like are given largely with this end in view. Nevertheless, the concise discussions on soils, their composition and character, the reasons for their exhaustion and the methods of restoring and enriching them, are useful to any one who has a vegetable garden or truck farm. In the list of vegetables described northern readers will be interested in such kinds as collards, for example, which the people of the south prefer to either cabbage or cauliflower; in goobers, which look like large one-seeded peanuts; in yams, which have never made serious inroads on the popularity of either the Irish or the sweet potato, although it was thought at one time that the Chinese and the Cuban

yam might replace them. By way of exemplifying the difference in garden practice at the north and the south a brief account of the southern method of cultivating Celery may be interesting. The seed is sown in July or August and in a cold frame, although, of course, this is not for protection against low temperature, but so that the young plants can be shaded from the hot sun. Very rich soil is used and plants are set out in October or November when the seedlings have leaf-stalks about three inches long. The great bulk of the cultivation is done in the seed-bed, and the plants are only hoed once or twice after the setting out, and then the earth is drawn up to the rows in an A-shaped ridge for bleaching, although this is sometimes done by banking with boards. The crop is ripe at the season when visitors are abundant in the south, so that very little of it comes to the northern seaboard markets, which are supplied largely from Kalamazoo, Michigan, and other northern points where the celery is kept stored for winter use. Spinach is sown in September or October. The seed of Kale is sown in October or November in cold frames, like Celery, and it is sent to northern cities during March, April, or even earlier. Peas are planted the last of October or in November, and so on.

The methods of transplanting, watering, fertilizing and cultivating are given with great detail for all the various kinds, and there are specific directions about making crates, packing, marketing, shipping, raising seed and preserving it for home use. The book contains 250 pages and it is written in a clear style, with as little use of technical language as possible, so that any one of ordinary intelligence can understand it. Altogether, it can be thoroughly recommended to any one interested in the growing of truck and vegetables in our southern states, and we may add that northern growers will find it singularly suggestive from the very fact that the methods of culture recommended are so strikingly different from those needed here for the same class of plants. If, for example, a certain crop is known to thrive here under one treatment, and in Florida under quite another, it will be comparatively easy for an observing student to judge what conditions are the essential ones needed by the plant and what points are of minor importance.

Notes.

Some of the lumber-trade journals are writing in favor of soft elm for the interior finish of buildings and assert that wherever it has been used in the western cities it has proved very satisfactory. It has long been used in the manufacture of furniture, where it has taken the place of plain oak, which it much resembles in grain, and there seems to be no reason why it cannot be used to good advantage in this new field.

In some of the fancy-fruit stores are seen considerable quantities of Sapodilla plums, the fruit of *Sapota Achras*. These so-called plums are as large as an ordinary apple and have a rough dull russet skin. Those now offered in this city were evidently picked when very unripe and are yet hard and uneatable. The fruit is only fit for use when it begins to decay, as it then loses its acrid milk. The skin becomes marked with black blotches and the flesh is a dull yellowish tint, soft and exceedingly sweet.

In a bulletin on the timber lands of Minnesota, prepared by Professor Green and Mr. H. B. Ayres, after it is shown that as the lumber business is now carried on in that state, the forest as a resource is constantly diminishing, it is estimated that the normal yield of the present forest area in its best condition and protected from fire would be about 2,000,000,000 feet, board measure, every year. That is, this supply, which could be maintained indefinitely, and perhaps even increased, is nearly twice as much as is now cut in the state.

A correspondent of *The Garden*, writing from the north-western coast of Spain in the middle of February, speaks of *Magnolia conspicua* in full flower, and *Camellias* as past their best. Chinese *Azaleas*, *Acacias* of various forms, especially *A. dealbata*, *Spiræas*, *Flowering Currants*, *Ribes sanguineum*, were in full bloom in the gardens, while the hedges and banks were blue with flowers of *Lithospermum prostratum*. *Primroses* were open along the banks of streams, and in shel-

tered hollows Dog-tooth Violets and *Narcissus Bulbocodium* were growing beneath the Pines, and among the Chestnuts the white Squills, yellow Oxalis, blue Myosotis and many other flowers were in full bloom.

The early settlers in the distant west found such a wonderful forest growth that their first thought was to cut it out of the way to make room for farms and vineyards. It is encouraging to observe that they now begin to realize the necessity of husbanding this most valuable of their natural resources. We note with pleasure that there is now before the Senate of the state of Washington an act to create a Board of Forest Commissioners, who are to collect and disseminate information concerning the trees native to the state, to study other forestry problems, to enforce the laws for protecting timber against fire and trespass, and to employ forest wardens, who shall patrol the woods in the dry season and assist in the prevention and suppression of forest fires. Another specific forest-fire bill has been introduced in the same body, and this makes the willful or careless kindling of a fire in the forest a misdemeanor, compels railroad companies to use spark-arresters on their locomotives and to use due caution about leaving hot coals where they may be dangerous.

Iris Bakeriana, which was discovered in Armenia in 1889 and disseminated by Herr Max Leichtlin, has become very popular in English gardens, and a late number of *The Gardeners' Magazine* gives a portrait of some of the flowers selected from plants which had just taken a first-class certificate at the meeting of the Royal Horticultural Society. In this country we do not avail ourselves as we should of the beauty and variety of the early Irises like those of the *Reticulata* class and a few others which come with the Snowdrops. Three years ago Mr. Gerard wrote of Iris Bakeriana that it had never disappointed him and was increasing at a fair rate, and on another page of this issue he gives it the highest praise. The flower is quaintly beautiful in form, and although individuals vary in color its prevailing tints of deep purple, or indigo-blue, light blue, and white spotted with violet are always harmonious and pleasing, and more than this it has a distinct fragrance. Even if these flowers were less beautiful their appearance in our wild spring weather, when they have so few rivals, would be a delight.

The Agricultural Appropriation Bill did not receive President Cleveland's signature, and therefore the iniquitous seed grab will once more come before Congress, and the country will have an opportunity to find out what sort of a man the new Secretary of Agriculture is. Mr. Morton's honest efforts at reform were defeated by the ignorance and folly of Congress. Now the question is open again, and the Seed Trade Committee has issued a circular for the purpose of enlightening public sentiment and arousing the moral activity of the people against the senseless and wicked free distribution of seeds by the Government. No doubt, a great portion of the twenty million packets of seed which are given away are wasted, but still it is a blow at the business of every honest dealer in seeds. There would be reason in an intelligent distribution of improved varieties of plants and of novelties properly placed among the experiment stations for testing, but this burdening of the mails with tons of seeds is not only a shameful extravagance, but it degrades every recipient to the rank of a pauper and obstructs honest business at a time when success is difficult even with the greatest economy and skill.

For some years past, potatoes in many parts of the country have shown unsightly pimples or projections on their surface, which have seriously diminished their value. The cause of this pimply condition has not been thoroughly understood until certain investigations carried on by the New York Experiment Station in Long Island showed that the injury was worked by a small flea-like beetle, well known as the black cucumber beetle, which has been detected in eating holes into the leaves of the Potato and Tomato just as it does in the leaves of the Cucumber. These voracious insects, however, are not the immediate cause of the mischief, but minute white grubs which are hatched from the eggs laid by the female beetle. These grubs burrow into the tuber and cause the pimples and the sliver-like projections which accompany them. The pimples result, it is probable, from the irritation caused by the worm, and the slivers are slender canals in which a single grub feeds. Either one of these characteristics of the disease may be found without the other. Bulletin 113 from the Geneva Station gives this important information, and states clearly how the disease can be controlled. The Bor-

deaux mixture, which has been found useful for so many purposes, is an efficient remedy here also, and when thoroughly and intelligently applied it keeps the beetles away from the plants.

Many of the vegetables coming from the south now are injured by heating during transportation, and others are inferior because they are the last of the crop. Eggplants are comparatively scarce, and sell for twenty to thirty cents each; string-beans command twenty-five to thirty cents a quart, and peas \$1.00 a half-peck. New Florida cabbage brings ten to fifteen cents a head, and turnips and beets, from Florida and South Carolina, cost seven and ten cents a bunch. New carrots come from South Carolina, Florida and the Bermudas. Spring onions, from New Orleans, cost seven cents a bunch. An increasing demand for tomatoes has made somewhat higher prices for this vegetable, the Florida product selling for twenty-five cents a pound, and that from northern hot-houses at thirty-five to fifty cents. Kohl-rabi, radishes, French artichokes and cauliflower are among the fresh vegetables now in season. The latter is from California and near-by hot-houses, and small heads cost thirty to fifty cents apiece. Good asparagus is coming from South Carolina in large quantities, and sells for sixty cents to \$1.00 a bunch. Bermuda and Cuba potatoes cost fifty to sixty cents a half-peck, and sweet potatoes, from New Jersey, twenty-five cents a half-peck. Lettuce, from Florida and from Boston, brings ten to fifteen cents a head, and hot-house grown cucumbers, also from Boston, fifteen to twenty-five cents each. Mushrooms cost sixty cents a pound.

Mr. W. Botting Hemsley writes entertainingly in a recent number of *Knowledge* about Captain William Dampier and his voyage of discovery to western Australia about two centuries ago. Fortunately, Dampier was a keen observer and knew something of botany, so that his descriptions of the flora, as well as the specimens he brought home, were exceedingly useful. In his book he describes a "sort of creeping vine that runs along on the ground, having a blossom like a bean blossom, but much larger, and of a deep red color, looking very beautiful." This was the first account of what came to be known as *Clanthus Dampieri*, the brilliant Glory Pea, one of the few plants figured in Dampier's work, *A Voyage to New Holland in 1699*. This is one of the most gorgeously beautiful plants of the great Pea family, and although it has been in cultivation in England for years it requires a skillful gardener to bring it to perfection. The flowers are four or five inches long, of a rich crimson red, with a flashing purple-black centre and a velvet-like texture. Another species of the genus, *C. puniceus*, was discovered in New Zealand by Sir Joseph Banks during Captain Cook's first voyage, and it proves much more easily cultivated than the Australian species. Since the Glory Pea grows with such luxuriance in its home it would seem that it ought to be within the skill of the gardener to cultivate it with more pronounced success.

Mr. Robert Thompson, of Bogota, in the Bulletin of the Botanical Department, recommends the naturalization in Jamaica of *Odontoglossum crispum*, which is found on the western slopes of the Colombian Andes, between the third and fifth parallels of north latitude, since the temperature of the Cinchona plantation, which is situated between 4,000 and 6,000 feet of elevation on the Blue Mountains, coincides with that of the natural habitat of *O. crispum*, and the wet seasons and dry seasons of the two places are very nearly similar. In the centre of the area of the natural distribution of these Orchids is the so-called Pacho District, from which most of the fine types come. Here the flowers are remarkable for varietal diversity, ranging in color from white to rosy mauve, and differing in size, form, substance, the spotting of the segments, and in almost every other particular. Their arching racemes remain in bloom about two months, and they flower almost the entire year through. Seeds are produced in great abundance, and, being extremely minute and light, they float in the air and are widely disseminated. Mr. Thompson thinks that if healthy plants were tied to the branches and trunks of the Cinchona-trees in Jamaica, or in separate groups in the forests of the Blue Mountains, most of them would flower in a year and seeds would mature in a few months. Within a couple of years they would be dispersed all over the forest, and in ten years plants fit for export could be had by the thousand. In order to show that this project is not visionary, it is stated that the Nun Orchid, *Phajus grandifolius*, which was introduced into the Botanic Garden at Jamaica many years ago, is now abundant on the highlands of the interior.

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Roadside Trees.

WE have often spoken of the beauty of our country highways and byways, especially in hilly and rugged sections, when nature is allowed to furnish beauty and shade in her own way with shrubbery and trees by the roadside. Every one can recall some example of a particular stretch of road which has come to be a personal delight, and then has been made desolate by the wanton work of some pathmaster or property-owner whose land abutted on the highway. In most states it is the privilege of landowners to do what they will with the plants by the roadside in front of their fields, and noble trees have too often in this way been sacrificed to the greed of private owners. Where a venerable tree stands by the wayside it becomes a part of the scenery, and as it has from time immemorial given pleasure to the entire community, every one who passes it feels that he has in some sense a right of property in it. We can recall one instance where three White Oaks had stood for nearly two centuries on a roadside in northern New Jersey. Men well advanced in life had heard their grandfathers speak of them as large trees when they were boys, and in the course of their long existence they had never harmed any one, but had been a source of delight to thousands. One day the owner of the property abutting the road was offered a few dollars for each of the trees by the operator of a sawmill, and in a few hours the trunks of these venerable landmarks were made into sawlogs, and the landscape lost an ornament which could not be replaced in a hundred years.

In most cities the owners of building lots are not permitted to do as they will with the street trees. These cannot be removed without a permit from some municipal authority, and why should not this rule be extended to the country? Certainly, trees are as beautiful and useful along a rural road as in a city street. Indeed, if the landowners in a farm region knew that the beauty of any countryside was a real factor in its money value they would be more careful how they defaced or mutilated the scenery by felling trees and disturbing wayside shrubbery. Many country places receive the largest part of their annual income from sojourners in the summer who leave the city for a

season of rest, and the general appearance of the country very often determines the tide of travel. It is, therefore, destructive of their own interests when the inhabitants of any section use the axe to obliterate natural beauty and rob their roads of all shady attractiveness.

Massachusetts began some years ago to enact laws for the protection of wayside trees, and Mr. Christopher Clarke, Trustee of Public Reservations, writes to the *Springfield Republican* to protest against cutting down these adornments of roadways. He asserts that if the destruction continues at the present rate it will not be long before every beautiful wooded drive or shaded road will be stripped bare and have nothing left but a hot and barren road, so that the principal attraction of many Massachusetts towns for former residents or summer visitors will be lost forever. He quotes one law in particular which gives the selectmen of a town, as well as certain city officials, an opportunity to mark roadside trees to be saved whenever a wood lot is to be cut, or when for any cause a tree is in danger, and such designation makes the preservation of this tree permanent. When such a tree is selected for preservation a spike is driven into it with the letter "M" at its head, and these spikes are furnished free by the Secretary of the State Board of Agriculture. Among the provisions of the various laws quoted are these: (1) No person shall cut down or injure any tree on any street or public road in the state; (2) no such tree can be legally cut down by any one except after due notice has been given or made to the selectmen of the town or the municipal authorities and proper consent given; (3) the penalty for cutting down a roadside tree is a fine of not less than \$5.00, or more than a hundred, one-half of which goes to the complainant, and the other to the use of the person upon whose property the trespass was committed; (4) a like fine is enforced if a marked tree or any other tree outside the fence or the line of the wood lot or homestead is cut down without authority, one-half going to the complainant and one-half to the city or town; (5) these laws apply to trees before any citizen's residence, farm or wood lot, bordering on any public road or street, and no roadmaster, forester or highway surveyor can cut down a tree without leave specifically granted by the city or town after a proper hearing.

We do not know how many other states have laws of this character, but certainly there ought to be enactments of this nature in every commonwealth. It is not generally known, even in Massachusetts, that some of these laws now exist, and Mr. Clarke asks every editor in that state to copy his letter, so that the people can take advantage of a protection that has been secured for them in the shape of legislation which will, if properly enforced, stop the wholesale destruction of beautiful trees still standing. It is especially urged that city and village improvement societies and rural clubs throughout the state unite in enforcing these laws, and we have no doubt that the conviction of a few offenders will do much to save trees in the future. Another suggestion made by Mr. Clarke is an admirable one: where large and beautiful trees are standing just outside of the line of streets or roads and on private grounds the trees might be purchased and allowed to remain and be marked for protection, so that at a nominal cost a continuous and effective shade could often be secured.

Certainly it has been too long the prevalent opinion that a tree has no value. Telegraph linemen, trolley-road layers and their employers generally have thought nothing of chopping down any tree which chanced to stand in the way of their work. These offenders have sometimes been brought to justice in courts of law, but they too often escape when the trial comes before a jury because these men cannot be convinced that the cutting of a tree inflicts any damage that a grown man can feel. Organization will do much to save the refreshing beauty of our country roadsides. This has already found expression in Massachusetts law, and if the same organization will strive to enforce the law the conviction of a few vandals will inspire

the rest of their class with some wholesome respect for public sentiment if they take no delight in rural beauty.

Sculpture in Gardens.

IF those restless spirits that possessed the Gadarene swine were to enter into the statues of Edinburgh, and if the whole stony and brazen troop were to hurry and hustle and huddle headlong down the steepest place near the city and into the deepest part of the Firth of Forth, art would sustain no serious loss." This is the picturesque language of Lord Rosebery in a recent speech, and it is quoted by Mr. William Robinson in his paper, *The Garden*, in an article in which he briskly attacks the use of sculpture in gardens. He goes on to say that the *Pall Mall Gazette*, in commenting on Lord Rosebery's words, expressed the wish that the "London monstrosities" would unite for the same sort of rush into the Thames. Mr. Robinson's comment is that when politicians and journalists begin to ask for deliverance from the statuary with which city squares and streets are adorned the lovers of nature are not likely to be infatuated with this kind of adornment for gardens, although there seems to be a renewed effort by some writers on garden art to make more of stone and less of verdure. It is often observed that good statues are more rare than good examples of painting or of the other fine arts, and this is one reason why the use of statuary in gardens is rarely effective, because a bad statue, however well it may be placed, can never be pleasing. Sculptors of distinction, as Mr. Robinson reminds us, do not usually concern themselves with garden designs, and when the architects or landscape-gardeners attempt to imitate the human form the work is foredoomed to failure. Probably no one who realizes the proper use of natural beauty in a garden would think of it as a place for exhibiting bad art in stone or cement. Every one has seen beautiful old walls in English gardens, and there is a kind of beauty in the architectural features of the old Italian gardens, although many people suspect that it is the beauty of decay; that the broken columns and crumbling statues are more impressive now than they were in their prime, from the very fact that their dilapidation tells their age and invests them with a halo of romance. However, we will let Mr. Robinson speak for himself, and quote the main part of his article:

Many foreign gardens are bestrown with statues and sculpture, though in northern countries like ours a statue of real value as a work of art deserves to be protected by a building of some kind, and the scattering about of numerous statues of third order of artistic value, or of no merit at all, which we see in some Italian gardens, often gives a very ugly effect. If a place is used for the exhibition of sculpture, well and good. But let us not in that case call it a garden, as it ceases to be one in the true sense. The great costs of such works should preclude their use, if there is no other reason, and getting the many beautiful living things which our gardens may be a home for, is the best use for the money we spend on them. The dotting of statues about the public and private gardens of Paris and London is destructive of repose, exactly in the degree to which it is carried. In Britain, statues are often of cast material, and what their effect is all who have seen them know. The people who use gardens to be spotted about with works of art do not understand that the garden is the best of all places to show the work of nature, and the most beautiful of natural forms is what one should expect to see here. The earliest recollection I have of any large garden or country-seat is of one strown with the remains of statues, and to explain its effect I quote from one of the novels of Monsieur Victor Cherbuliez: "He passed before the open gate of a spacious garden which formerly presented to the admiration of visitors beautifully straight alleys bordered with nicely trimmed globe and cone-shaped Yews, shrubs arranged in angles or in chess-board form or devised to imitate a wall, with sheared trees and statues everywhere. It was one of those classical gardens whose planners prided themselves upon being able to give nature lessons in good behavior, to teach her geometry and the fine art of irreproachable line. But nature abhors such lines. She is a reluctant pupil of geometers, and submits to their tyranny with an ill grace. The garden which Lionel entered had been badly kept after the death of the Baron, and

decay had degenerated into ruin. The large basin no longer held any water, and the dolphins which once spouted it from their throats seemed to be asking each other why they were in this world. But the statues had suffered most. Moss and a green damp had invaded them as if some plague or leprosy had covered them with sores, and pitiless time had mutilated and insulted them. One had lost an arm, another a leg, and almost all, their noses. There was a Neptune with a damaged face and nothing left but his beard and half his trident. Rain water stood in the hollow neck of a Jupiter without a head, and a little Pan, with his back against a rock in a thicket, stood where he had blown his pipes for near two centuries, but he had no longer any pipes or hands or breath."

Mr. Robinson adds to this a suggestion which certainly ought to be considered, namely, that while stone will wear away in any climate, it will crumble most rapidly in the cold north, where frosts and thaws and rain and drought occur in such severe succession. Stone-work, wherever it is unprotected in northern latitudes, rapidly disintegrates. The face of a marble statue will be seamed and scarred in a few years, and stone balustrades and terrace-work quickly decay.

Pinus palustris in France.

SO far as I know, the two trees figured on page 115 are the only Long-leaved Pines of respectable size now existing in France. They stand at Geneste, some eight miles from Bordeaux, near the border of the sand hillocks which stretch to the sea and near the famous Médoc district. And yet the Long-leaved Pine once created considerable excitement in France, and large returns were anticipated from planting it. The journals and reviews of about 1830 contain many references to the tree, and François André Michaux read a lecture before the Royal Agricultural Society in praise of its timber. He considered the name *Palustris*, given to it by Miller, as inappropriate in view of the sandy soil where the forests of this Pine grew, and he added that, if we can judge from the language of Miller himself, there were more specimens of the tree growing in English gardens in the middle of the last century than there were in his own time. Michaux stated that trees near Philadelphia had endured a temperature of fifteen degrees, Réaumur, uninjured, which testified to its hardiness, and considering its ability to grow in the poorest soil, in connection with the beauty, strength and durability of the wood and its capacity to produce turpentine, it ought to become of economic importance in the south and west of France.

In the same year seeds were distributed by the Minister of Agriculture among all who were willing to experiment with them, and quite a quantity was sown in Fromont, the celebrated establishment of Soulange-Bodin, to furnish amateurs with the young plants. Soulange-Bodin made an extensive report in 1831 of his sowings, and referring to the prospects of the tree he says that "it ought to succeed in the Live Oak region," which was an accurate statement.

To return to Geneste. The estate was then owned by Monsieur Ivoy, a gentleman interested in agriculture and forestry, who planted in his park a good many American trees, especially Oaks and conifers. In 1831 he sowed some poor seed of Long-leaved Pine, and the twenty-three seedlings that resulted looked like tufts of grass without stems at the end of the year. Some of these were planted not far from the house, and thirteen years later they were all thrifty but one, the largest being twelve metres high. The only care given to the trees was some superficial hoeing, and last December one of the trees measured eighteen metres in height, and another sixteen metres, while the circumference of the first at one metre from the ground was 1.70 metres, and of the other was 1.50 metres.

Close to these Long-leaved Pines is planted a *Loblolly* Pine, and the volume of this tree is more than twice that of the Long-leaved Pine. We gather from the notes of Monsieur Ivoy that they were planted the same year. Another plantation of *Pinus palustris* was made in 1827 by Mrs. Aglaé Adanson in her park near Moulins. Three or four

trees were alive sixteen years later, and they had endured some severe winters; but this is a cold region, and they were killed before they attained any stately proportions. So did most of the trees at Geneste. The two survivors were further from the lake and on higher ground than their fellows. No Loblolly Pines at Geneste have been killed by frost, and a beautiful specimen is living on the small island in a brook hardly above the water-level. Fine specimens of Liquidambar, Bald Cypress, Cedrus, many Oaks, Hickories and Tulip-trees add to the interest of the place, still possessed by the granddaughter of Monsieur Ivoy.

Michaux, as we have said, rather overrated the importance of the Long-leaved Pine for planting in France, and his confidence that it could be grown under the same conditions as the Pinaster and furnish superior and more abundant products in the shape of timber and turpentine was not justified. The Pinaster, or Maritime Pine, as it is commonly called here, can be safely planted in the south-west and west of France, where thousands of acres are planted with pure forests of this tree, although there may occur two or three winters in the century which will freeze the tree in central France. The seed of the Pinaster is abundant, cheap, and can be sown like grass on the heath, and the young seedlings will make long shoots from the first and quickly overtop other growth. The Pinaster also gives prompt returns of wood and turpentine, and trees twelve years old can be cut down to make posts for wine galleries and will give rosin before they are twenty years old, if planted far enough apart from each other. At thirty years it furnishes a fair amount of timber of poor quality, and at forty the tree is old. Again, the Pinaster is an excellent tree to protect the coasts of the south-west against sand-drifts, which formerly advanced from the sea until they were successfully resisted by this tree. Compared with this tree the less hardy Long-leaved Pine will flourish in a more restricted area. It would require greater care and much longer time to grow into merchantable timber. According to Dr. Mohr,* it ought to stand until it is from 90 to 140 years old. The trees at Geneste, although sixty years old, are still practically valueless, while the Pinaster would have paid twice the rent of the soil. Finally, where there is no habitual and fairly large production of any product, the disposition of it at a paying figure is always difficult. Small copses or woods, small forests and individual lots of trees seldom make a profitable speculation. If there were a chance of growing any American Pine in company with or in place of the Pinaster, the Loblolly would be better than the Long-leaved Pine, as it would, at thirty years, afford a greater quantity of timber superior to that of the Pinaster, and which might possibly find a market.

The timber of the Long-leaved Pine imported into this country has been largely used under the name of Pichepin, an evident corruption of Pitch Pine. Struck by the beauty of the wood, many planters in France have tried to grow the tree that produces such fine timber. They have sent to America for seeds of the Pitch Pine, but to the seedsmen of New York and Philadelphia this meant the seed of *Pinus rigida*, so that nine buyers out of ten have received what they did not want. This confusion arises from the similitude of the two words in different languages. In France, as in America, *Pinus rigida* will give no timber of the first quality and is good only for fuel. Its place is in the sandy soils in districts too cold for the Pinaster, where the rainfall is large or the water-table near the surface. In rich soils it will grow to form picturesque specimens for parks, but it is not of economical importance in this country.

Paris.

Maurice L. de Vilморin.

The Pitch Pine is the most cheerful of our trees in early spring. When seen on a distant hillside it harmonizes perfectly with the yellow sand and the March sunshine; indeed, it has an ingrained sunniness which gives the landscape just the warmth it needs.—Thoreau.

* *The Southern Pine*. United States Department of Agriculture, Washington.

Foreign Correspondence.

London Letter.

ENGLISH ORCHARDS formed the subject of a lecture by Mr. George Gordon, editor of *The Gardeners' Magazine*, before the Society of Arts on March 3d. Mr. Gordon has for years preached the gospel of English fruit, and last year he sent a specialist to report on the condition of some of the orchards in various parts of England, the result of which he published. It revealed, on the whole, a deplorable state of things, as deplorable as the condition of, for instance, some departments of agriculture in this country. The farmer will not grow wheat nor potatoes at a loss, nor will the orchardist grow fruit which he cannot now sell at a profit owing to foreign competition. It has been shown again and again, by men who have tried, that such products as apples and pears are bad business in England unless one is specially favored. On the other hand, strange though it may appear, it pays to grow these fruits for one's own use; it is only when one goes into the market with his fruit that he finds himself undone by the foreign article. After all, the middleman must live. As to the quality of English-grown apples there can be no two opinions, ours being first, and the rest nowhere. Cox's, Blenheim and Ribston Pippins among the dessert kinds, and Bismarck, Prince Albert, Lord Suffield and Echlinville among cooking varieties, cannot be equaled by the best of imported fruits. Mr. Gordon says that the hundreds of inferior varieties now occupying our orchards should be burnt and replaced by such sorts as those here named, and that apples worth from £10 to £20 per ton are surely more profitable to grow than those which will not realize more than from £1 to £5 a ton. If orchardists saw any chance of obtaining these better prices, no doubt they would hasten to follow Mr. Gordon's advice. Englishmen, even when gardeners and farmers, are not, as a rule, asleep to their own interests. Mr. Gordon says we grow too many sorts. "Before we can make our orchards profitable we must follow the example of the American growers, and instead of planting two or three trees each of a hundred varieties we must plant a hundred trees each of a few varieties, and these of the very best."

PICEA OMORICA.—*The Gardeners' Chronicle* this week publishes a picture of a cone-bearing branch of this, the Servian Spruce, which is represented by a group of healthy young trees in the Kew Arboretum, raised from seeds obtained from Belgrade about ten years ago. It promises to be a good plant for England; at any rate, the Kew plants are exceptional, both as regards health and rate of growth, compared with other Spruces, last year's shoots being from a foot to eighteen inches long. The leaves are less than an inch long, almost flat, instead of being quadrangular, as in other Spruces, with two whitish lines on the upper side. The cones, which are one and a half inches long, are produced in clusters, sessile on the stronger branches, or terminal on the short lateral shoots. The tree is a native of the mountains of Servia, Bosnia and Montenegro. In stature it is said to equal any of the European Spruces. Its nearest ally appears to be *P. ajanensis*.—[*Picea Omorica* was raised in 1881 in the Arnold Arboretum from seeds sent by Dr. Bolle, of Berlin. It has grown rapidly in Massachusetts, where it is perfectly hardy and promises to be a distinct and useful ornamental tree.—ED.]

RHODODENDRON PRÆCOX is one of the greatest treasures we possess as a shrub for beautifying the garden both inside and out in early spring. The mildness of February this year has specially favored it, and the scores of bushes of it in the shrubberies and beds outside have been glorious pictures of rosy mauve for the past fortnight. Nothing could be more beautiful, and I would class it with *Forsythia suspensa*, *Magnolia conspicua*, *M. stellata* and *Jasminum nudiflorum* as a first-rate early-flowering hardy shrub. It is, of course, as hardy as the Alpine Rose, but a snap of frost is apt to spoil its often too venturesome flowers. Indoors it is almost equally valuable, for it forces

well and the flowers last and keep their color. Its nearly, Rosy Bell, is almost as useful. These two plants are hybrids, for which we are indebted to Messrs. Davies, of Ormskirk, near Liverpool. R. Nobleum is also exceptionally good this year, the flowers being large and bright in color. It has been in flower out-of-doors since the middle of February.

CYPRIPEDIUM FAIRREANUM.—As bearing upon the subject of raising rare and valuable Orchids from seeds obtained artificially and without crossing, which I suggested in one of my letters as worthy consideration, the following is interesting: In the Journal of the Agricultural-Horticultural Society of India for December, 1896, p. 534, it is stated that Messrs. F. Sander & Co., St. Albans, will give £1,000 for an importation of *Cypripedium Fairreanum*, the habitat of which is unknown, but is suspected to be Burma. The same firm also offer £1,000 for a good plant in flower of *C. insigne*, with the flower pure white and of normal size. The albino is not likely to be forthcoming, although seeing how many albino sports among Orchids are now known, such a plant may possibly be found. The importation of *C. Fairreanum*, however, ought not to be difficult. It is estimated that a pod of *Cypripedium* contains about four million seeds; *Cypripedium* seeds vegetate freely and plants are quickly grown from them; a pod of ripe seeds of *C. Fairreanum* ought, therefore, on this showing, to be worth a considerable sum.

BERTONERILA.—This is a composite name for a bigeneric hybrid between *Bertolonia* and *Sonerila*. *Bertolonia* is a genus of some six species, all South American, while *Sonerila* is East Indian and comprises some fifty species. According to the *Genera Plantarum*, the two genera belong to different sections of Melastomaceæ. We owe the cross to Monsieur Linden, of *L'Horticulture Internationale*, Brussels, who publishes figures and descriptions of six varieties with popular names. The characters of the two parents are evident in the foliage of the hybrids, which are blotched and spotted with white and rose on a green ground. The names of the parents are not given, but I suspect they are *B. maculata* and *S. Hendersoni*, or near allies of these. For furnishing the surfaces of large pots in the Orchid-house or stove we find *Sonerilas* and *Bertolonias* most suitable, and, no doubt, these *Bertonerilas* will be equally serviceable.

PITCAIRNIA CORALLINA.—The *Pitcairnia*s are considered either weedy or too botanical by cultivators, but this species deserves to be ranked with handsome winter-flowering stove plants. It forms a tuft of erect lanceolate Curculigo-like leaves a yard or more high, and in February it develops its flower-spikes; these are short, horizontal or turned suddenly at right angles just above ground, projecting outward about a foot and clothed with bright crimson tubular flowers from one to two inches long. A well-grown specimen in a shallow pot a foot across will produce half a dozen flower-spikes, which last in perfect condition several weeks. There are also two hybrids between this species and *P. Altensteinii*, which were raised by continental growers a few years ago and which possess most of the good points of *P. corallina*. This species is a native of Colombia, whence it was introduced by Monsieur Linden in 1874.

CYCLAMEN PERSICUM PAPILIO.—I mentioned this new sport a few weeks ago, when examples were submitted to the Royal Horticultural Society by the raiser, Monsieur Vervaene de Langhe, the Brussels nurseryman. He has lately forwarded a collection of the flowers to Kew, together with an account of the origin and development of the sport. Twelve years ago he started to select and breed the Persian Cyclamen for an improved leaf coloration. Among the seedlings thus obtained he observed one which showed broad horizontal petals with crisp margins. These characters were reproduced in the seedlings obtained from this sport, but they were all mauve-colored. To get variety of color he crossed them with other colors and selected the best from the progeny, breeding from these again. He has now numerous seedlings of varying shades of color from

white to purple, and all showing the peculiar pose and crispness of petal which distinguishes this from all other sports obtained from the Persian Cyclamen. Either we are better acquainted with the cultural requirements of this plant than we used to be, or, what is more likely, breeders have improved the constitution of the plant by crossing and selecting, for it is cultivated with far more success than formerly, some growers producing easily in about twelve months from seeds plants which twenty years ago would have been considered miracles by the most expert growers.

London.

W. Watson.

Plant Notes.

BEGONIA LYNCHIANA was introduced from Colombia about 1877 by Monsieur Roezl, who sent it to Monsieur Bernary, of Erfurt, Germany. It was distributed under the name of *B. Roezlii*, but as there was already a *Begonia* of that name, Sir Joseph Hooker renamed it in compliment to Mr. Lynch, the curator at Cambridge, who had been the means of its becoming known in England. Mr. John Coulson, of Worcester, Massachusetts, says that he has grown *B. Lynchiana* from the original stock of Bernary and finds that it is almost the same as *B. semperflorens gigantea rosea*.

BEGONIA SEMPERFLORENS GIGANTEA ROSEA is one of Lemoine's hybrids introduced in 1888, being a cross between *B. semperflorens* and *B. Lynchiana*. It is one of the very best greenhouse plants we have, has beautiful deep green foliage, and produces an abundance of flowers of a rich shade of rosy red. As it flowers from October to May, it is especially valuable for winter decoration of all kinds. I am of the opinion that the hybrid has almost reverted back to *B. Lynchiana*, or that the *sempperflorens* type has not entered sufficiently into the cross to enable us to keep them distinct. A description of this hybrid, from plants growing at Cornell, is appended:

Rootstock woody, stems succulent, about three feet high, smooth, green. Leaves on short petioles, ovate or reniform, toothed at the margins, about seven inches across, bright green, with a spot of red at the base of the sinus, tinged with red on the under side. Peduncles axillary, stout, four to eight inches long, bearing large panicles (six to eight inches in diameter), of large rosy red flowers. Males with two ovate petals three-quarters to one inch across; females with two to four petals somewhat smaller, ovary three-angled with broad rounded wings. We are able to determine no greater difference between *Begonia Lynchiana* and the *Gigantea rosea* than would occur between plants arising from the same stock. For further information regarding these plants, I would refer to *Botanical Magazine*, t. 6758; *Journal Royal Horticultural Society*, xv., 15, January, 1893; *Regel Gartenflora*, 1876, page 194, plate 871; *Nicholson Dict. Gar.*; *The Garden*, xxiv., page 162, plate 402; xxv., pages 489 and 534; xxvii., page 417; xxix., page 206; *Gardeners' Chronicle*, 1884, page 774; *GARDEN AND FOREST*, ii., page 113, March 6th, 1889; *American Gardening*, xv., page 346, October 12th, 1895.

Cornell University.

P. B. Kennedy.

Cultural Department.

American Trees for Ornamental Planting.

AT the meeting of the Lenox Horticultural Society, on the 4th of March, Mr. B. M. Watson, of the Bussey Institute, read a paper entitled "Some Native Trees and Shrubs," in which he commended many of the wild plants growing about the Berkshire Hills as in every respect equal, and oftentimes superior, to imported garden shrubs and trees. He invited attention to the fact that the Arnold Arboretum was a living museum of the woody plants hardy in eastern Massachusetts, and that the plantations had now reached a stage of growth from which it is possible to learn many useful lessons. It offers, at least, an opportunity to study our native trees and compare them with each other and with those from other countries. Many foreign trees, like the Scotch and Austrian Pines, the English Oak and the Sycamore Maple, which had been largely planted in this country, do not thrive under New England conditions. European Beeches, White Willows and many Japanese and Asiatic trees and shrubs are thoroughly

adapted to our soil and climate, and some of them harmonize with native species which have not been generally planted, and which, indeed, it has been difficult to obtain because nurserymen have not kept them on sale, and it has been harder to obtain many native shrubs and trees than to secure plants from distant continents. Fortunately, American nurserymen are now giving greater attention to our needs in this direction, they are propagating our native trees in quantities, and the supply promises to be abundant. In speaking of native trees for ornamental planting, Mr. Watson omitted many of our best trees because they have been largely planted and their qualities are well known. Among these are the Sugar Maple, the Buckeyes, the Tulip-tree, the Chestnut, Catalpa, Elms, Ashes, Kentucky Coffee-tree, Box Elders, Hop Horn-

its red flowers and fruits, together with the yellow "pussies" of the Willow, give distinct warmth to the landscape in early spring. *Acer spicatum*, the Mountain Maple, is a small tree and often a tall shrub in the north, with a good habit of growth. The coloring of its abundant fruit in early autumn is very interesting. It succeeds well in partial shade, and is a good plant for any use wherever a rapid-growing tree of moderate size is needed.

Amelanchier Canadensis, the Shad-bush, in all its forms, is a thoroughly good plant. It gives a mass of flowers in early May, and when well grown it makes a symmetrical small tree. The fruit is edible, and its foliage is interesting at all seasons, although it is sometimes attacked by the cluster-cup, a fungous growth, against which no remedy is as yet known. This



Fig. 14.—*Pinus palustris*, near Bordeaux, France.—See page 112.

beams, Poplars, Locusts, Prickly Ash, with all the conifers and broad-leaved evergreens; but I send in a condensed form some of his notes on certain trees which ought to be more widely used, omitting the shrubs for the present.

The Scarlet Maple, or Swamp Maple, is a smaller tree than the Sugar Maple; it is of slow growth, sturdy habit and good proportions, suitable for either swampy or well-drained ground, although it is usually found in the former situation. Its special merits are its scarlet flowers in very early spring, which are followed by scarlet fruit, while in autumn its foliage is of the brightest yellow and scarlet. Its bright scarlet twigs in winter should also be noticed. It is an admirable tree for the borders of ponds and along the banks of streams. A most pleasing effect can be obtained by planting it with the White Willow, as

plant varies widely in form and size, some varieties being low shrubs, while others make sturdy trees forty feet or more in height.

The Canoe Birch is somewhat slow in showing its pure white bark, but when this feature comes it remains, and the tree is a long-lived one. The glittering trunk and the airy head of the mature trees give them an especial beauty. The Yellow Birch is a sturdy, broad-headed tree with lustrous bark. The Black Birch, with its fragrant branchlets, its beautiful aments in the spring and its clear green foliage, is attractive all the year round. The Red Birch has a richly colored bark, and all are trees of singular grace and beauty, and have a certain distinction which adapts them for use in the most pretentious parks.

Cercis Canadensis, the Judas-tree, is better known in cultivation than many of the trees of our native forest, and it is a first-rate small tree for planting among larger ones in open spaces or on the borders of heavy woods. This, together with *Cornus florida*, the Flowering Dogwood, succeeds admirably in such a position where there is abundant light or air, and both flower abundantly in the early season. No imported trees equal them for such positions.

Cladrastis lutea, the Yellow-wood, is also well known to us in cultivation, and is really one of the best of our trees of medium size. It combines symmetrical growth, fine foliage and handsome flowers. It is particularly good when used as a single specimen. One peculiarity should be noticed, and that is, the trunk often divides near the ground, and this is a source of danger, as the tree sometimes splits apart. One of the stems should be removed when the tree is small, so that the other one can develop symmetrically, or the two should be firmly bolted together.

The American Hawthorns are all useful at every season, and *Crataegus cordata*, *C. coccinea*, *C. tomentosa* and *C. crus-galli* are all good where showy fruit is desired in autumn and early winter. They will make impenetrable thickets where needed, and perhaps they would make better hedges than the famous English Hawthorn. Without enlarging on the special beauties of form and fruit and foliage in each, it is worth saying that they are all admirable trees for parks and gardens either in masses or in single specimens. Our American Beech is not planted nearly as often as the Purple Beech, a variety of the European species, but its fine trunk and singularly smooth gray bark ought to commend it to every planter. *Magnolia macrophylla* is rarely found in northern gardens and shrubberies, perhaps because it is difficult to carry through its first few years. When once established, however, it seems to be thoroughly hardy here in Massachusetts, and gives great satisfaction. The flowers are often more than twelve inches in diameter and the leaves more than two feet long. It is altogether the showiest and most tropical in appearance of any of our hardy trees. It does best in soil containing peat, and is benefited by copious waterings in hot July and August weather. All *Magnolias* thrive in peaty soil, and the best Chinese *Magnolias* I know are growing in a well-drained and protected swamp.

The American Crab Apple is not only one of the best of the flowering Apples now so justly popular, but when compared with the better-known *Pyrus spectabilis* and *Pyrus floribunda* and their varieties, it has two peculiarities worth mentioning. The first is the lateness of its flowering time, which comes from ten to fifteen days after other apple blossoms have formed; and, secondly, the exquisite perfume of its flowers. These peculiarities are both desirable and ought to commend this much neglected tree.

The *Sassafras* is one of the most attractive trees in our forest. In eastern Massachusetts large specimens are rare, because it is said that the early settlers dug them up so as to export the roots and bark, from which they derived a considerable income. Here along the Connecticut valley, however, there are some noble specimens. The *Sassafras* is not a hard tree to grow and responds quickly to kind treatment and good soil, and its distinct form and dark green foliage, its well-proportioned head and general clean appearance make it highly desirable.

The Bald Cypress, *Taxodium distichum*, is a tree of striking individuality. Unfortunately, it is somewhat tender in New England, but if set in a sheltered place and some extra care is given to it when first planted it can be grown to fair size, say thirty feet in height or more, and a ripe age. The foliage is most graceful and pleasing in color.

Our common American Linden, or Basswood, and the Southern Linden, *Tilia heterophylla*, when compared with the more commonly planted European Lindens, are certainly more desirable. The native trees are better on account of their larger and handsomer foliage, which does not fall as early in the autumn as that of its European relatives, and its flowers come later. These are clean, wholesome trees which are beautiful all the season through.

The Hickories are said to be slow-growing trees, but in the Arboretum I have observed that for the first ten years or so their growth compares favorably with that of our other hardwooded trees. The Shell-bark Hickory, the Big Shell-bark and the Bitternut have attained a height of from twelve to sixteen feet in ten or twelve years and, as yet, show no signs of stopping. Much is due, perhaps, to the care with which they are treated. The plants are grown from seeds in boxes in the greenhouse, and thus they develop fibrous roots in great quantity. They are permanently planted in carefully prepared soil

when less than a foot high. Nurse plants of native shrubs are provided to give them protection, and these are cut as soon as they interfere with the growth of the trees, a treatment which ought also to be given to our Oaks and the Beech. A well-grown Hickory is a tree of great dignity and beauty, and yet very few of them have been planted in American parks.

American Oaks also have the reputation of being slow growers, but this is not deserved, except in the case of a few species. The White Oak and the Bur Oak, especially its variety *olivæformis*, are certainly not rapid growers. The Scarlet Oak is moderately slow in its early stages, but it is so attractive in its autumnal foliage that this fault, if it is a fault, must be overlooked. The Black Oak develops rapidly, and the Swamp White Oak, although not among the most rapid growers, is a finely shaped tree and always interesting in bark and foliage. The Laurel Oak is perfectly hardy in the Arboretum, and is a most interesting tree with bright, glossy leaves, long and lanceolate, which give it a distinct look and distinguish it from all other species. It is better for New England planting than the Willow Oak on account of the tenderness of the latter tree. The Pin Oak is one of the most rapid-growing species, and it is one of the most beautiful. It is distinguished by its fine and symmetrical proportions and its bright glossy foliage. Although it lacks the beauty of many other Oaks in autumnal coloring, it is so good for every other purpose that it can hardly be planted amiss. The Chestnut Oak grows well. It has admirable foliage, distinct and clean, of beautiful shape and color. The Red Oak, *Quercus rubra*, is a noble tree, and, at least in its earlier stages, is a most rapid grower. Acorns planted in the autumn of 1895 made seedlings two feet high in the summer of 1896. The average growth of some hundred plants was over eighteen inches. Of course, this was in well-prepared soil. In the open ground the safest way, undoubtedly, is to plant it in boxes and thus secure fibrous roots. The Red Oak is one of our largest trees and is distinguished by rare beauty of form and foliage. It is the most satisfactory, perhaps, of all the Oaks for planting singly in avenues or in masses. Of course, it is hard to use Oaks for street planting, inasmuch as trees from ten to fifteen feet high are required, but with care and frequent transplanting in the nursery this can be accomplished, and for this use the Red Oak, the Pin Oak, the Chestnut Oak and the Black Oak are to be recommended in the order given.

It will not answer to treat our trees carelessly because they are native. The soil should be prepared for the commonest of our native plants with the same care that we would exercise if we were planting some high-priced novelties from Manchuria. Much depends on having a deep, rich loam, containing organic matter—humus in the form of peat, leaf-mold or well-rotted barnyard manure—which will tide newly set plants through the first few years of their life, and especially through our hot July and August weather. It is also generally desirable to use as far as possible small or moderate-sized plants. Of course, the immediate effect is not as striking as when larger trees are used, but the first cost and the percentage of loss is much smaller, and the result at the end of five years or so is usually much more satisfactory.

Lenox, Mass.

E. J.

Cymbidiums.

THE complaint is often heard that Orchids as a family are far from being ornamental when not in flower, and to the ordinary observer there is nothing to be admired in a house of Cattleyas when the plants are not in bloom, although to the cultivator or connoisseur there is not a day in the year when these plants are devoid of interest. The charge of looking ugly or commonplace cannot be brought against the Cymbidiums as a genus, for even when not in flower they are striking in appearance, especially when seen as large specimens, and many of the species last so long when in bloom that they are among the most decorative of garden plants. There are no difficult subjects in this genus. All of them are terrestrial plants and require a compost that has a basis of loam with enough Fern fibre and broken bricks to make it porous, and they can be easily grown in a moderately cool house. A minimum temperature of fifty degrees in cold weather will suit them better than a higher one, for we have observed that to make some of the species, such as *C. Lowianum* and *C. giganteum*, flower freely it is best, after the growing period in fall, to keep them somewhat drier and cooler, to prevent a tendency to start into a second growth, which invariably prevents the production of a full quota of strong flower-spikes.

Cymbidium eburneo-Lowianum is a plant of hybrid origin, as its specific name indicates, and it was originally distributed by the Messrs. Veitch some eight years ago. As it is the off-

spring of two of the best-known species it is regarded as a triumph of the hybridist's skill. A short time since Mr. George MacWilliam, of Whitinsville, Massachusetts, received a first-class certificate for two plants exhibited before the Massachusetts Horticultural Society of this same cross which showed marked differences from the Veitchian hybrid as shown by the colored figure in *The Garden* of October 5th, 1895. This improvement is not surprising, as the parents were both very fine forms of the two species, and the brighter coloring of the petals and sepals and greater portion of the lip, that is colored bright red, marks these two plants as distinct improvements on the original as figured by Mr. Moon in *The Garden*. Mr. MacWilliam states that the plants are but four years old from seed, and while only two have flowered this season out of the great number he has raised from the pod of seeds, many more will probably be strong enough next winter, and it will be interesting to mark the variation in the individuals, if there is any. This clever hybridist has found that no two individuals can be depended upon to come alike from the same seed pod, the variation being great, both in the plant and flower. Another remarkable fact concerning the seedling *Cymbidiums* is, that while the strongest have flowered this winter there are many tiny plants just appearing on the benches and on various pots that are obviously from the seeds sown at the same time.

There are many surprises always in store for the hybridizer, and the interest that attaches to a lot of seedling Orchids cannot be described in words. It has just been demonstrated by Messrs. Veitch that albinos occur among Orchids raised from seeds produced by colored parents, as in *Lælio-Cattleya Decia alba*, figured in *The Gardeners' Chronicle* (February 20th, p. 121), and another clever operator has shown that albinos can be produced true from their own seed. Mr. Cookson has raised *Cypripedium Lawrenceanum* Hyeum from seed, and the plant has flowers that are even larger than those of its parent. It is a form of *C. Lawrenceanum* without the purple in the flower, the white and pea-green giving a beautiful effect, and it will be an inducement for hybridizers to attempt to reproduce the exquisite yellow *C. insigne* Sanderæ true to itself rather than to adulterate it with foreign color.

South Lancaster, Mass.

E. O. Orpet.

Notes from the Botanic Garden of Smith College.

ALTHOUGH the Japanese Red-bud, *Cercis Chinensis*, winter-kills badly in this neighborhood unless it is well protected, it is one of the best shrubs we have tried for forcing. It is just now (March 1st) one of the most conspicuous objects in a cool greenhouse; the lovely pink blossoms are larger than those of our native Red-bud, and are borne in greater profusion. Our plants were lifted and potted last fall and stored away in a deep frame until three weeks ago, when they were brought into the greenhouse. Another good plant for this purpose is *Berberis aquifolia*. We use the same plants every winter, and they are producing twice as many blossoms now as they did three winters ago, which was the first winter we tried them. *Magnolia stellata* forces well, but the blossoms do not last more than four or five days. *M. fuscata*, an evergreen species from China, is just coming into flower. *Daphne Cneorum* is one of the very best plants we have for forcing. The sweet-scented pink flowers are borne in terminal clusters on each of its many branches.

Among herbaceous plants now in flower none are more beautiful or make better potted plants than the common Bleeding-heart, *Dicentra spectabilis*. The English Wallflower and Brompton Stocks are in full bloom and are very sweet. Seeds of both were sown last April, and the plants grown on in pots all summer. Auriculas grown from seed sown last April have produced good-sized blossoms, some measuring one and a half inches in diameter.

Northampton, Mass.

Edward J. Canning.

Cypripedium spectabile.—I once saw a remarkable display of this beautiful pink and white Lady's-slipper in Minnesota. At the foot of a little hill, overshadowed by the boughs of trees and watered by a trickling rill on one side and a reedy lake on the other, was a small peninsula that was completely covered with tall, rank *Cypripediums* in full bloom. The curious inflated flowers, flamed and rayed with clearest pink-purple, were the largest I had ever seen, the foliage the most luxuriant, and the plants the tallest. The spectacle presented by scores upon scores of these great flowers lighting up the wilderness which man had rarely penetrated was really magnificent. And can we not here find a hint for those so fortunate as to possess shady grounds sloping down to a brook or pond? Wherever this queen of our native Orchids is yet to be found it can be

naturalized in some such appropriate nook in the garden. Plants can be removed from their native haunts in spring and summer with tolerable success, if the transplanting is done with care. But they will be thriftier and more apt to live if moved in autumn while the plants are dormant. The wide, plaited leaf is so peculiar that it is easily recognizable, even when hanging limp and brown on the dead stalk. In places where wild plants are not available the roots can now be bought in quantity at reasonable prices.

Pineville, Mo.

Lora S. La Mance.

Cypripedium insigne, var. *Mutchianum*.—This plant seems to deserve a varietal name for its distinct and beautiful form, its great size, firm texture and prominent markings. It appeared among a group of the popular *Cypripedium insigne montanum* in Mr. J. E. Rothwell's collection at Brookline, Massachusetts, and he has dedicated it to his gardener, who maintains a large collection of *Cypripediums* in vigorous health. The most distinct characteristic of the flower of the new plant is its long dorsal sepal, fully half of which is pure white, the basilar portion being studded with deep chocolate-colored spots surrounded with numerous smaller spots of the same color. The inferior sepal is pea-green, sparingly spotted with light brown; the petals have thick lines of spots, deep brown in color, which become obscure near the extremities; the pouch is yellow, with a light bronze suffusion, the staminode being rich shining yellow. It is one of the many desirable varieties of this popular Orchid, and is represented by a fine well-grown specimen.

Cypripedium Leeannum, var. *Zenobia*.—This is closely allied to *Cypripedium Leeannum delicatum*, a hybrid obtained from *C. insigne* Sanderæ and *C. Leeannum*. It differs, however, from any yet flowered by its almost white dorsal sepal, a few lines of very minute spots radiating from the base and two lines of light reddish spots running through the centre; the petals are very pale yellow, with rows of small reddish brown spots, the tips being absolutely pure white; the labellum is bright yellow with a faint brown suffusion; the staminode is clear lemon-yellow. It flowered for the first time in the collection of J. E. Rothwell, Esq., Brookline, Massachusetts, among a group of plants of unrecorded parentage, and although many of the finest existing varieties are grown here, this is the most striking of those which have yet flowered.

New York.

A. Dimmock.

Removal of Greenhouse Shading.—When the naphtha-white-lead mixture is used for shading greenhouses it is often difficult to remove the lead, since it adheres tenaciously to the glass. If the lead used be unadulterated it may be softened and in part removed by an application of diluted vinegar or acetic acid. This acid converts the basic carbonate (white lead) into the soluble acetate, part of which dissolves and runs away, while the remainder can be more easily rubbed off if still wet. It was found by experiment that a mixture of about one part vinegar to four of water was very successful, and that the solution could be used effectively several times, depending upon the strength of the vinegar. If the lead has been adulterated with barium sulphate, the common adulterant, the barium will peel off of itself or can be more easily removed by scraping than when the lead is pure. Barium sulphate will not yield to the vinegar, since it is very insoluble.

Ithaca, N. Y.

M. G. Kains.

Correspondence.

Notes from Gardens in Brookline, Massachusetts.

To the Editor of GARDEN AND FOREST:

Sir,—Brookline, Massachusetts, has long been noted for its community of interesting gardens. A visit at this season of the year is naturally confined to the inspection of the many interesting collections of plants under glass, although beautiful trees and shrubs are not without attraction even in winter.

Professor Sargent's remarkable collection of Indian Azaleas here is yet in winter quarters in deep pits, except a few plants of the earlier varieties, which are being brought into bloom by gentle forcing. The season will thus begin now, and continue through the splendid display in May and June, and a few will be held until July. *Imantophyllums* have done well here this year and wherever I have seen them. These evergreen *Amaryllids* have always seemed coarse to me, but it must be admitted that well-bloomed specimens of the deeper orange-flowered varieties are handsome, and their colors combine effectively when properly used. They are

here set on the ground level, and thus appear to good advantage. This appears to be the best season to bring them into flower, for I have noticed when they have been held in check in cool houses to retard the flowering season they have not done so well. Mr. Harris, gardener to Mr. H. H. Hunnewell, tells me when they have been advanced in cool houses to the bud stage, and are then taken into warmer quarters to bloom, they expand to almost twice the size they would be if grown continuously cool. Mr. Sanders, gardener for Professor Sargent, is an enthusiast in growing Begonias. A selected seedling from *B. insignis* shows up remarkably well in this large collection, and compared with the type is far more ornamental. A handsome plant of *B. Ferdinand de Lesseps*, a shrubby greenhouse hybrid, has made wonderful growth. It is a summer bloomer, and later will be a mass of white flowers. *Streptocarpus Wendlandii* is just coming into bloom here. Like some of the older varieties, it produces only a single leaf, but of very large size. The leaf itself is not without beauty, and, reflexing, gives the plant a peculiar one-sided appearance. The flowers, however, are neither as large nor as handsome as one would expect, and are, in fact, smaller than those of the newer hybrids. The Cherokee Roses, already in bloom, give promise of hundreds of flowers each day in the near future. The large single white flowers are really handsome, and it is surprising that such a lovely Rose is not more generally grown as a cool-house climber in the north. Some of the retail florists have tried it, but it does not seem to satisfy the popular taste, which prefers double flowers. Some new hybrid *Hippeastrums*, recently imported, look promising in one of the houses, and some are already in bloom. The elimination of the green band is nearly complete, and shows what careful hybridization can accomplish. A pan of the white Grape Hyacinth, *Muscari botryoides*, var. *alba*, was perfection itself. These less common bulbs grown in this way are very effective. In the grounds I noted one of the original plants of *Berberis Thunbergii*, now a bush about nine feet in diameter and five feet high, and about fifteen years old. It is in excellent health and shows its value for permanent planting.

At Dr. Weld's place I found a fine collection of stove tropical plants. That handsome, but deadly, Aroid, *Dieffenbachia*, is here represented by several handsome plants. This native of tropical South America is valuable on account of its luxuriantly spotted foliage. Among the most highly ornamental plants seen here is *Heliconia aurea striata*, with large Maranta-like foliage, striped and spotted with yellow. It is allied to the Banana family. *Licuala grandis*, a rare and beautiful Palm from the South Sea Islands, makes a beautiful display here. Until it was recently rediscovered in limited numbers, the large plant in the collection of Mr. H. H. Hunnewell was one of only four or five known in cultivation. The beauty of its almost circular and purely palmate leaves is not approached by any species of the entire Palm family. *Pavetta Borbonica* is a beautiful foliage plant of slow growth, and resembles a dark green spotted *Ficus*, with opposite leaves. It is allied to the *Ixora*. Other plants noted in Dr. Weld's houses were specimens of *Dracæna gracilis*, a distinct and beautiful species with long, narrow, recurving foliage, slightly tinted with purple. Its value lies in its distinctness. *Cypripediums* are among the few greenhouse Orchids with handsome foliage. They are here represented by some beautiful pans of *C. Lawrenceanum* and *C. callosum*, besides a varied general collection. *Curmeria* (*Homalomena*) *Wallisii*, a noteworthy plant, looked like a dwarf *Dieffenbachia*, but on close inspection we find the leaves are leathery, its stems are different, and it is of much slower growth and difficult to cultivate. A splendid show of *Cinerarias* and *Cyclamens* makes one house bright with color, while some standard plants of *Acacia pubescens* and *A. heterophylla* serve to relieve what would otherwise be a surfeiting impression, for some of these gorgeous displays seem almost too showy. Among the *Cyclamens* are such good varieties as *Rosy Morn*, *Alba magnifica*, *Mont Blanc* and *Brilliant*.

Wellesley, Mass.

T. D. Hatfield.

The Rotation of Species of Trees Under Forest Conditions.

To the Editor of GARDEN AND FOREST:

Sir,—Considerable discussion has been occasioned by the questions in regard to reforestation in the first report of the Chief Fire Warden of Minnesota. This problem of forest perpetuation and forest rotation is an interesting study. The opinion often stated is that the natural rotation in species of

forest trees is a necessary result of an impoverished condition of the soil; that one species or family takes a different food from another, and after one species has taken the nutriment it prefers there is not enough food remaining for a second crop, so that another kind steps in, a kind that relishes and thrives upon the plant-food that remains. But this idea of soil impoverishment under natural forest conditions is in opposition to all modern teaching. It is held, nowadays, that the forest is a restorer of plant-food, so that one crop of trees leaves the soil better for having sustained it. Forest rotation or the succession of species is not, therefore, sustained by the theory of deficient nourishment. Even if we were to specialize and attribute the phenomenon to a single ingredient of plant-food, the hypothesis would still be inadequate, for all classes of forest trees take the same foods in slightly varying proportions only.

But if variation in the condition of the soil does not serve the purpose, will a consideration of the tree's reproductive organs solve the problem? The Pine family is capable of producing, and frequently does produce, an abundant seed crop. Failure to reproduce itself cannot then be attributed to lack of seed-production. Are these seeds prepared to withstand adverse conditions? No, they have no hard nutty covering as do those of the Oaks and Hickories. The seed, while provided with wings to facilitate its transportation, soon loses its vitality if exposed even to the conditions of the natural forest. In other words, the Pine seed must find congenial surroundings for germination soon after it is shed from the cone, or it perishes. Pines do not produce seed each year in succession, and consequently the loss of the seed crop of one season may delay a stand of young seedlings for several years. Young seedlings of most trees are tender as regards adverse surroundings, and this is especially true of the Pine. When favorably lodged, however, the seeds of the Pine germinate readily and the young seedlings thrive under proper conditions of shade and the like, but with our lack of system in forest management these congenial conditions for germinating the seed and developing the young seedlings are rarely provided. When a propitious environment chances to be present, the White Pine reproduces itself readily.

Since, then, other species are more commonly the successors of the Pine than its own kind, it stands to reason that the conditions have been too severe for the reproduction of the Pine. It is also an indication that other species are more virile than the Pine. Is there in nature any reason for this? If the theory of a natural progression from the lower to higher forms in the organic world is to be maintained, there is ample reason for these peculiarities of rotation or succession of species.

According to Gray, the Pines are the oldest representatives of our forest flora. The giant Sequoia is a lone survivor of a great, and at one time numerous, group of plants. The Ginkgo, a native of the orient, is at present reduced to the stand of a monotype species. Formerly it undoubtedly had many coördinates. The Sequoia, the Ginkgo and the Pines all belong to the same general scattered family of Coniferae. It is known that there are among this family representatives of once prosperous genera. What does this mean? Simply this, that the great order Coniferae is slowly and gradually losing ground in the natural competition for supremacy. They are, in other words, less virile than many of their competitors. More congenial conditions for growth and development must be provided for them than for other species with which they now have to contend. Then, again, if we examine the structure of the floral or reproductive apparatus of the Pine we find it less highly developed than the same organs in their more successful rivals. This indicates that the Pine is less highly organized than other trees. The more highly a plant or animal is organized, or the more complex its differentiation, the more capable it becomes of adapting itself to slightly changed conditions. The low position in the scale occupied by the Pine, to an extent, explains why it does not reproduce itself. In fact this, to my mind, is the keynote to the whole situation, for all necessary adaptive variations are limited by the station occupied by the plant.

If what has been stated is true, and the White Pine requires extra care in order to induce it to perpetuate itself, then it is our business as lumbermen and foresters to study those conditions and plan to conduct our operations so as to maintain the proper soil, shade, moisture and other conditions suited to the growth of this most valuable forest-tree.

Substitutions for this timber are constantly being tried, but for some purposes the White Pine is greatly preferred to other woods, and it will always be in demand.

West Virginia University, Morgantown, W. Va.

L. C. Corbett.

Bibliographical Notes on American Trees.—I.

To the Editor of GARDEN AND FOREST:

Sir,—That elaborate contribution to dendrological bibliography which Mr. George B. Sudworth has lately offered, in Bulletin 14 of the United States Department of Agriculture, cannot fail to be received as a standard manual of the nomenclature of our trees. It is, therefore, important that errors be pointed out as promptly as may be that other writers may avoid repeating them; and from an examination of a few of the earlier pages of the volume I infer that these errors may prove somewhat numerous. Mr. Sudworth seems to have neglected a considerable number of books which might profitably have been consulted by one who is to give a list of our trees, with nomenclature and citations correct, under the rules adopted in this work. For example, *Larix*, as a genus distinct from the Linnæan *Pinus*, is attributed to Adanson (1763), whereas two important dendrological authors restored the genus within the first decade after 1753, namely, Miller in 1759, and Duhamel in 1755. *Abies* is still farther from being attributable to Jussieu and the year 1789. It was maintained by Hill as early as 1756, and even a year earlier than that by Duhamel, so that to this last-named author belong both *Larix* and *Abies* as post-Linnæan genera. And here let me observe that Dr. Britton's *Illustrated Flora* is in need of the same corrections here indicated.

That *Picea rubra* can hardly be maintained for our Red Spruce has lately been suggested by Mr. Jack (GARDEN AND FOREST, vol. x., 62-64); but the reasons for the retirement of this name, under the rules by which Mr. Sudworth and others guide themselves, are more numerous than Mr. Jack has shown. I suppose that a too implicit trusting to the *Index Kewensis* has hindered our authors from discovering that the *Abies rubra* of Poiret was at the time of its publication a mere homonym. Even on an earlier page of Poiret this name occurs as a pre-Linnæan synonym of *A. excelsa*, Poir. But that which, under the rules alluded to, completely invalidates the specific name *rubra* for any American tree of this group is the fact that, only three years after 1753, Hill published the common European Spruce as *Abies rubra*, so that *Picea rubra* fails of applicability to any tree of our country, for the reason that it really belongs, under said rules, to that which is now generally known as *P. excelsa*.

Catholic University, D. C.

Edward L. Greene.

Recent Publications.

A Manual and Dictionary of the Flowering Plants and Ferns. By J. C. Willis, M.A., Director of the Royal Botanic Gardens at Ceylon. Cambridge, England. 1897.

This work consists of two parts, the principal one being vol. ii., which is an arrangement in the alphabetical order of their Latin names of all the classes, cohorts and natural orders of plants, besides several thousand genera, including all the British genera, the greater part of the common European and American genera and the principal southern and tropical genera. This volume comprises 428 compactly printed duodecimo pages. Vol. i. is shorter, consisting of little more than 200 pages, and at the outset it was intended, the author says, as a sort of supplement or index to the dictionary. But it was found necessary to broaden this scheme, so that it appears now as a fairly complete treatise on the morphology, classification, natural history and geographical distribution of plants. Mr. Willis justifies the preparation of this part of the book in its present form by the fact that there was really no good text-book on the natural history of plants or their geographical distribution available in English, the morphology in such books as exist being out of date and not based upon evolution. The principles of classification and of evolution are not explained in elementary English text-books on the ground that they are too abstruse, and in advanced books it is taken for granted that students are already familiar with them. But, notwithstanding the form of this little treatise, the original design of it is preserved, so that it well serves the purpose of cross reference to the classified list in Part ii., while as a text-book it may also be expanded to almost any degree by referring for details to Part ii. Besides the mere names, this alphabetical list, by a system of abbreviation and condensation, contains a vast amount of information. The families of plants

are treated with much more fullness than in ordinary systematic botanies, while the genera are discussed more briefly, except in cases where they have characters of special interest which distinguish them from the rest of the family. The book would be better if it contained more illustrations, but floral diagrams of the larger families will be found and other figures which illustrate difficult groups within the families. Genera which have economic uses are very fully catalogued, although the products and methods of obtaining them are not generally given. The general arrangement is that of Engler, although sufficient reference is made to the classification of Bentham and Hooker to enable any one to use that system. The nomenclature is chiefly that of the *Index Kewensis*, and the more common and important synonyms of the different genera are given. Altogether, the little book will be very useful to students to whom works of general reference are not available. Even when they are, their bulk as well as their antiquity makes it troublesome to use them. Of course, such detailed information as may be required by specialists is not to be looked for here, but the beginner will find what he needs upon most subjects which do not require the use of a microscope.

Mr. Willis's book is one of the useful Cambridge Natural Science Manuals, and it belongs to the Biological Series which has been prepared under the general editorial supervision of Arthur E. Shipley, M.A., Fellow and Tutor of Christ's College.

Notes.

The colors of the fruiterer's stock have not a little to do with its attractiveness, and at this time the deep rich orange of the Navel fruit from California, the paler color of Messina lemons and large, smooth-skinned grape-fruits, and the brilliant red of tiny Lady apples and of large Baldwins make bright spots in displays which include the more neutral-colored mushrooms, pineapples, Winter Nelis and P. Barry pears, Catawba grapes, and what is probably the last importation of English hot-house grapes, each bunch cut with a piece of the stem. Some of the rough-skinned King of Siam oranges, from California, are now offered, and this novel fruit costs \$2.00 a dozen. Other delicacies seen in the windows of fancy-fruit stores are beautiful smooth hot-house tomatoes, perfectly grown cucumbers, blocks of maple-sugar and half-pound pats of "fresh" or unsalted butter done up in white oiled paper, and costing thirty-five cents each.

Mr. George L. Russell recently read an essay before the Board of Trade at Orlando, Florida, on the "Possibilities of Pineapple Culture," which he considers among the most promising of the industries of that state. There is always a demand for the finest fruit. A twelve-inch home-grown sucker will come into bearing in a little more than a year and the structure for properly shading an acre of land need not cost more than \$450. Varieties like the Smooth Cayenne, Golden Queen and others of prime quality attain a size of from six to twelve pounds each, and ought to command at retail in northern markets at least a dollar. One great trouble has heretofore been that the tender fruits are injured in transportation, but a kind of crate has been devised which will hold a dozen fruits of the first size, packed in excelsior so as to prevent their bruising, and they will keep in this way at least a fortnight, which will afford ample time for transportation, even to foreign markets.

An article on seed-sowing in *Vick's Magazine* recommends the scattering of fine hay or the clippings of the lawn, just thick enough to lightly cover the soil, over a bed where seed has recently been sown. The advantage of this is that it breaks the sun's rays and, like any other mulch, prevents the rapid drying out of the soil, especially when the wind blows. But it is particularly useful in preventing the surface of the soil from becoming beaten and pasted down by watering or rain. May soils bake after they have been watered, but when the water is sprinkled on so as to filter through the mulch it does not wash the seeds bare nor beat down the surface, and, of course, the shading, too, prevents it from hardening into a brick-like consistency. No general rule can be given as to the depth of sowing seed, and in light sandy soils the covering can be thicker than in those of heavy clay. A seed that has a covering four times as thick as its own diameter is not buried

too deeply, and a simple sifting of soil over the finest kind of seeds after they have been sown upon the surface will suffice, provided the soil is afterward properly pressed against the seed, or "firmed," as it is called. In the case of large seeds gardeners often tramp on the row, and with lighter ones a hoe blade or a block of wood is used for compacting the soil.

The windows in the uptown flower stores make a brave display even during the Lenten season, a comparatively dull trade time. Under the influence of the bright clear weather of these early spring days the masses of bloom show good color and vigor. Sturdy clumps of forget-me-not, the tiny flowers set in abundant foliage, immense pansies of many hues, long stems of lily-of-the-valley, little bunches of yellow primroses, vases of the beautiful blue cornflower, well-grown heliotrope, giant heads of mignonette, and single, and the deeper-colored double, violets are seen in almost all collections. There are also dainty buds of moss roses, great spikes of forced gladiolus and quantities of Easter lilies. White sweet peas make a delicate showing, and one of the windows had a drapery of Swainsonia, the finely cut leaves and clusters of white flowers being peculiarly effective and satisfying. A row of flowering plants of *Amaryllis* set in a bed of green foliage plants made a gorgeous display, the rich red flowers borne on their stout stems, some of them two feet high. Large yellow and white marguerites, double white snapdragon and beautiful pink tulips and many other bulbous flowers added to the variety, with French lilacs, Jacqueminot, American Beauty and other roses. Hardly any potted plants in flower are shown now, these being held in the greenhouses for Easter, and only a few pots of violets were seen, and the quiet flowers nearly hidden in the luxuriant leaves seemed especially fitting at this time.

Bulletin No. 124 of the Cornell University Experiment Station contains particulars of the pistol-case-bearer, an American insect, which has been known for twenty years, but which has never done any serious damage except occasionally in New York and Pennsylvania. The insect is one of those which are encased in a curious-shaped suit after the fashion of the cigar-case-bearer, and this bulletin gives such an interesting description of the habits of the interesting little animal that no intelligent farmer's boy can fail to be interested if he once begins to read it. Professor Slingerland's work does much more, therefore, than give some immediate information about the pest and the methods of fighting it, it helps to encourage "correct and hopeful habits of thought." Experiments seem to show that the insect can be held in check by a spraying of Paris green or the Bordeaux mixture applied very thoroughly. When it is abundant at least two applications should be made before the blossoms open. If the Bordeaux mixture is applied with the Paris green at the second spraying the apple-scab fungus will receive a check, and this period between the setting of the bud and the opening of the flower is just the time when the bud-moth as well as the cigar-case-bearer needs a dose of poison, since all three of these pests often occur together. If any of the pistol-case-bearers are left they can doubtless be poisoned by an application of Paris green made a little while after the petals fall, and this is also the best time to spray for the codlin moth or appleworm. A fruit tree should never be sprayed while it is in blossom.

Mr. John Craig, of the Canadian Experiment Fruit Farm, read a paper recently before the Michigan Fruit Growers' Association, giving an account of some experiments with the different standard varieties of Peaches and Plums, with a view of testing their relative ability to produce fruit after winters of unusual severity. Twigs of the different varieties bearing fruit-buds were taken from a number of localities in the Dominion and examined with a lens, and most of the cions were placed in water in a glass-house where the blossoms were allowed to expand. Of course, the percentage of fruit-buds killed on a Peach-tree is not the measure of loss to the crop the ensuing year. If a fruit set for every bud that opened, thinning would be absolutely necessary, and the frosting of some buds might prove a help to the crop. Again, the specimen twigs may have been largely cut from the lower branches of the trees where the temperature is colder at critical periods than at the top of the tree where the greater part of the fruit is found after severe winters. The tables presented, therefore, of the different varieties of Peaches and Plums grouped in relation to the power of their fruit-buds in resisting frost, are merely tentative, although they have some value as a list subject to revision. Several interesting facts, however, were noted. For example, tender fruit-buds are not always associated with tender leaf-buds. As an instance, the Plum Glass Seedling suffers less than most varieties at Ottawa from the

winter-killing of terminal shoots, but it bears no fruit except after very mild winters. Other varieties which have their terminal wood killed back annually, like the Damsons, nevertheless produce fruit regularly on spurs of the older branches. This means that in the north there is much to learn on this subject, and after the selection of varieties of merit and of known hardiness the advice to cultivate so as to encourage the ripening of both wood and fruit-buds is the most practical that can now be given.

The Office of Road Inquiry of the United States Department of Agriculture has published a circular on brick-paving for country roads, which sets forth an experiment made recently by the citizens of Monmouth, Illinois. This vitrified brick, as is well known, is not made of clay, but of a peculiar shale rock, and it is so hard that a sharp-edged fragment of it will cut steel. In accordance with a law which authorized the construction of macadam or other hard roads in Illinois, the land-owners of Monmouth have laid an experimental section of vitrified brick road at a cost of about ninety cents a running foot. The road is eleven feet wide, and on either side of it there is an earth track for use in dry weather, making altogether a road forty feet wide. Stone roads in that region have cost seventy cents a running foot for a track eight or nine feet wide, and, of course, the glazed brick makes a much smoother surface. It is suggested that in many places, for example, where there is a short roadway subjected to very heavy traffic, as about factories, mines and railway stations, two parallel strips of these brick, from sixteen to twenty inches wide, could be laid through the middle of the macadam road and gauged so that the wheels of all kinds of vehicles could follow them. The decreased traction would be as great as if steel rails were laid in the macadam, and if properly set they would last a long time under any traffic where a macadam road is justified. It is also pointed out that these strips of brick pavement would make admirable bicycle tracks.

The Wild Garlic, *Allium vineale*, is not a native of this country, although in Pursh's *American Flora*, published in 1814, it was already reported as common in old fields. It is too well known to need description, and it is one of the most injurious of weeds in the middle Atlantic states; it disfigures lawns; it gives an evil flavor to milk and its products; and, since its bulblets are about the same size as wheat-grains and mature when winter rye and wheat are harvested, these are often ground with the flour and impart a strong flavor to it. Besides this, the bulblets form a varnish-like coating on the rollers of the flour-mills, which makes it necessary to shut down the mill until this gum is washed off. The weed is very difficult of extermination. An acre of land near Germantown, Pennsylvania, was trenched by hand to a depth of three feet, and all the bulbs found were picked out and destroyed, and although the quantity of the Garlic was much reduced, a sufficient number of bulbs escaped to reseed the land within a few years. Hand-pulling just at flowering time is only partially successful, and the cultivation of hoed crops is ineffective by itself. If land is plowed late in the fall, so as to leave the bulbs near the surface and exposed to freezing and thawing, many of them will be killed, and the surviving shoots can be destroyed by spring cultivation, after which oats may be sown or corn can be planted. This process repeated for two years will destroy nearly all the Garlic, and the remaining plants can be exterminated by hand. A bulletin published by the Department of Agriculture gives some very interesting facts in regard to this evil weed, and it recommends, among other remedies, (1) that the soil should be shaved near the surface as often as the shoots appear; (2) that lime should be put liberally on the pastures and meadows to help the grass and crowd out the Garlic, and (3) that hogs should be confined on Garlic patches. It is added that a single drop of carbolic acid on a leaf or shoot will kill the entire plant. Half a teaspoonful of the acid applied so as to strike most of the shoots in a clump as they grow in pastures will kill them all. The cheaper quality of the acid, worth from thirty to forty cents a gallon, is effective, and should be used with little dilution, and applied with a machine-oil can. On the grounds about the White House in Washington, comprising eight acres, an abundant stand of Wild Garlic was nearly all destroyed by a single application of carbolic acid. The cost, including the acid, cans for applying it, and the wages of the boys who did the work, amounted to nearly \$10 an acre. The grass was practically uninjured, and during the following season it covered the spots where the Garlic had been destroyed. To complete eradication by this method the land should be carefully looked over during each of two succeeding years in winter or early spring when the plants are not hidden by other vegetation.

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Garden Design.

LAST November Mr. Inigo Thomas delivered one of his periodical addresses on Garden Art before a London society of architects, and it has been published in successive numbers of *The American Architect and Building News*. This lecture, like the one he delivered a year ago, and which was also republished in this country, is interesting, and to a certain extent instructive, although it contains nothing which had not been said in *The Formal Garden in England*, a book written by Mr. Thomas in collaboration with another young architect, Mr. Reginald R. Blomfield, some half-dozen years ago. Mr. Thomas describes with sympathy some of the old gardens of Italy, of Scotland and of England, and almost induces the reader to share with him a little of the enthusiasm which he thinks he feels over Yews pleached into cubes and obelisks, geometrical designs in Box and compartment gardens. We cannot but agree with him that there was design of these old places, and that even in northern latitudes and in modern days it might be possible, under certain conditions, to connect a garden of this sort with certain kinds of architecture that would be satisfying from many points of view. But Mr. Thomas does not rest here. He continues to deny that there can be anything like art in gardens of any other kind. He theorizes upon the assertion, so often made, that in the very nature of things such an art as landscape-gardening is impossible, and that formal gardens alone show anything like design. This means that one can have a certain narrow architectural training and skill and yet possess no sympathetic appreciation of charming scenery and no feeling for natural beauty. Painters of landscape know that there can be beauty of composition in trees and shrubs and grass naturally arranged, and few people have their sense of beauty so deadened by technical study that they do not enjoy this beauty as it appears in nature. Whenever a planter so models his grounds and so arranges the elements of verdure he employs as to give to the beholder the impression of a beautiful natural group, there can be no question but that he has created a work of art.

The fact is that there is more than one kind of a garden

and that gardens are made to fulfill many different purposes. It is not logical, therefore, to hold that because one kind may be good for a certain restricted use all the other kinds are essentially bad. Of course, there are bad gardens of all kinds, and the most sturdy reactionist would hardly claim that all formal or architectural gardens are good, and we have, therefore, tried to learn what are the essentials of a good garden according to Mr. Thomas. He asserts that he is advocating principles, and the most complete statement of them is found in a passage where he insists primarily on "an enclosure, decided and uncompromising, not of sunk fences or iron palings, but of good honest masonry high enough to cast broad shadows early and late and keep the wind from the flowers and fruit-trees; then subdivisions either by subsidiary walls or hedges of Yew or Box, almost as dense as the masonry itself; then that the proportioning of the surface of the ground has much the same treatment that the designer deals out to the façade of a building." Now, there are many places and many climates where a garden treated on this plan by a genuine artist could be made a most appropriate and attractive addition to a house, but every reader can recall some country place without its high and uncompromising wall which has the same sense of shelter and seclusion by its position and distance from the roadway and its background of foliage, and perhaps its protection of a belt of shrubbery dense enough to serve as a hedge. We know many charming places in America that would be disfigured by a high-walled enclosure with subdivisions as dense as a wall. And yet we should like to see some artist of real creative ability attempt a garden of this kind in connection with a house of some pretensions in America. Formal gardening as it is known here means little more than ribbon lines, or geometrical flower-beds and a straight hedge or two, and it would be an education in garden-art to see an American realization of Mr. Thomas's ideal. We have few opportunities here to see high garden walls such as Mr. Thomas commends. These walls have a genuine use in England, for against them fruit-trees and vines are trained to catch the warmth of the scanty sunshine. We do not train our Pear-trees or Peach-trees on espaliers in this country, and perhaps in our bright sunshine the walls would look hard and staring. Since art is the decoration of a service and never runs counter to common-sense principles or every-day usefulness, it may well be that each country and climate should develop a style of gardening distinctly its own, and we probably should make quite as serious a mistake in adopting the design of a garden which would be beautiful and useful in England as we did in the beginning of the century in using so many of the trees and shrubs which flourish in England, and in not availing ourselves of the treasures of our woods.

But what we set out primarily to notice was an error into which Mr. Thomas falls at the beginning of his address, and which ought not to go uncorrected. His model garden is one of symmetrical spaces whose design bears a decided relation to the architecture of the house. Indeed, he asserts that nothing else is a real garden and that what has passed under that name for nearly a century would have been called a wilderness in better days. But he adds—and here is the error—that the leading purpose and chief interest of planters who use the natural arrangement is to have a "growth of rare shrubs and plants." This is fundamentally false and it shows how superficial Mr. Thomas's information is in regard to landscape-art. The real master of garden-art is not a mere horticulturist nor one who aims to gather a collection of rarities and have a museum of living plants. There are, it is true, enthusiasts who take pride in showing visitors the latest *Cypripedium* or a new Birch from Manchuria that no one else has grown. This passion, however, can exist without the slightest taste in the arrangement of plants or the slightest feeling for the poetical charm of a landscape. To the real master of the natural style of landscape-art the individual plant is only an element in a picture, and it is always subordinate to the

total impression. It is the greatest artist who can produce the most impressive pictures with the commonest material—ordinary shrubs and trees and grass. Indeed, so-called specimen plants have a larger and a more important place in the architectural or formal garden than in the best work of those who attempt to hold the mirror up to nature.

It is a pity that the advocates of formal gardens so generally misrepresent what is the fine art of gardening, for there ought to be no conflict between the so-called schools. The man who creates broad and tranquil pastoral scenery, so that it presents to the imagination pictures of peace, is certainly an artist. The man who in a smaller way treats a bit of ground about a house with a leading motive, so that the picture is a unit in its expression, is certainly as much of an artist as one who makes a perfect balance in the orderly arrangement of his hedges and scroll-work. The latter may be art, too, just as surely as the mingling of colors and forms in an oriental rug is art; but the formal garden addresses the æsthetic sense alone, and if there is a difference in degree it is the nobler art which appeals to something beyond the sense of beauty, and taking the materials which nature gives so groups them as to make a picture with power to stir the feelings and touch the heart.

The Ideal Grape.

ONE of the strong features of the horticultural teaching at Cornell is the seminary work, which is really a modification of the old lyceum idea. Teachers and students meet together in an informal, half-social way to discuss some topic which is previously agreed upon. The result has been the organization of a club known as the Horticulturists' Lazy Club, and it is provided with a unique and attractive club-room built especially for this use, and connected with the forcing-house. Pictures of horticulturists and botanists, fruit and flowers, diplomas and other subjects relating to the craft are hung about the walls. Here every Monday night from twenty to thirty enthusiastic students meet, Professor Bailey being among the number, and here, too, at all times of the day they find a waiting-place and a meeting-place. There is a growing library in the room, with files of the leading horticultural journals in English, French and German. At each meeting some student makes running comments on the horticultural news in the papers and books, and then the topic for the evening is taken up. This Lazy Club is so democratic that it has no officers and no rules. There is simply a register in which each participant places his name, if he desires to, at each meeting. Near at hand is a storage cellar, in which over thirty varieties of apples have been kept, to enliven the exercises all winter long, and there is always something in the forcing-houses to provoke discussion.

Aside from the stated meetings of the club, a seminary on plant-breeding has been running on Thursday nights during the winter term. The business of this seminary has been to discuss the fifteen rules in chapter iii. of Professor Bailey's *Plant breeding*. The book was used as a text-book in the fall term, but about fifteen advanced students have discussed the questions more at large during the winter. Having finished the fifteen rules and having two meetings of the term left, the seminary took up the question of "Unattained Ideals in the Strawberry and the Grape." The Grape meeting was enriched by letters from Grape experts, one of which, by Mr. T. V. Munson, has been sent to this journal by one of the members of the seminary. The paper is so good that we publish it entire.

THE UNATTAINED IDEALS IN THE GRAPE.

When it comes to the practical point of combining all the desired characters in one variety, it is found there are conflicting elements to be worked out first. To render my meaning clear I will mention the characters desired, yet not found combined in any variety in existence, and which quite probably never can be:

1. Vigorous, healthy plant; resistant to fungous diseases

and to phylloxera; hardy to withstand cold and heat north and south; long-lived; prolific; adapted to all tillable soils and aspects.

2. It should ripen a constant full yield, evenly in the cluster, here in the south from June 25th (when the very earliest known varieties begin) until November 1st, or to the time of killing frost.

3. For appearance sake it must bear a good-sized cluster, neither too loose nor too compact, with berries never below medium size (unless in wine grapes, when they may be smaller), persistent to the pedicel, with skin thin, tough, never cracking in changing weather, and in color yellowish green, lively red of various shades, and black, as these shades are always in good demand throughout the entire season.

4. The requirements as to flavor demand a skin non-astringent and non-pungent; a pulp tender, meaty or juicy, yet not "slushy," like that of a berry affected by white rot, as some varieties naturally are, rich in both sugar and acid so as to be sprightly, yet not too tart (Delaware is a little "tame"; Catawba just beneath the skin is excellent, but next the seeds too acid, while the Vinifera class is generally too much like sweetened water in flavor, and Iona at its best is perfection); flavors must be delicate, not musky like the Labruscas, however—a faint touch of this is permissible. (There are peculiar and various very agreeable fruity flavors in our native Post Oak grapes, V. Linsecornii, of Texas, Indian territory and south-west Missouri, which I consider superior to any other native grapes.) The dead, earthy taste found in the after-taste of most Labrusca varieties is to most grape connoisseurs even more objectionable than their "foxiness"; the seeds should be small, soft, few (one to three), and separating readily from the pulp. The sprightliness and flavor should remain in the grape a long time. (The Concord becomes flat here in the south in a few days after it turns black.)

Now, it is clear at once that no one variety will ever be developed to supply all the above requisites. The varieties that ripen in the heat of summer quickly pass away. Two weeks is about the length of time that the best varieties will keep their character, in July and August, although they last much longer in September and October, so that our grape season requires at least five successions of two weeks or more to cover our entire grape season.

The old standard varieties are all gone here by about the first week in August. After that for a month the Rotundifolia varieties come in. I have tried to fill in this gap and have partially succeeded in the varieties named Fern, Lanssel and Marguerite.

Each of the five ripenings should have at least one first-class red, one yellow and one black table grape, to say nothing of wine grapes, thus making at least fifteen varieties to cover the season in the south. For the north one half the number would be sufficient. By comparing the above ideal succession with the actual it will be quickly seen that the field is not occupied by a great deal either north or south, but better in the north than in the south.

If you will endeavor to fill up each square of the following diagram with an ideal grape, as outlined for it above, with nine squares, or a month and a half for the north, say, the latitude of New York, and for fifteen squares or the full season of three months, the deficiencies will at once become apparent:

	BLACK.	RED.	YELLOW.
First ripening, 15 days, . . .	1	2	3
Second ripening, " . . .	4	5	6
Third ripening, " . . .	7	8	9
Fourth ripening, " . . .	10	11	12
Fifth ripening, " . . .	13	14	15

Grapes which are of a green color when ripe are undesirable, so are pale dull red ones such as Perkins, and varieties which ripen unevenly, as the Concord generally does in the south, are almost worthless. The Elvira is a green grape, the Pocklington a yellow grape; the first is far better in quality, but the latter will outsell it on account of color.

When all points constituting the ideal variety for each space are considered, it will be found that nearly, if not quite, all the spaces will be found empty, and this emptiness only shows the work yet to be accomplished by originators.

Let us try a few varieties and see where and how they fit. Space No. 1 will not contain Champion on account of its poor quality and its habit of dropping from the cluster, but it would go in so far as productiveness and size are concerned. Campbell's Early is now being put forward as completely filling it,

but it has not yet been given a practical test in most parts of the country. My Presly, tried in Space 2, fills the requirements fairly as to earliness and vigor, also in color of berry, but it is lacking in size both of cluster and berry, although it is as large as the Delaware; neither is it prolific enough in the weight of fruit, nor of good enough quality, yet it is considerably better than Champion.

In season, Winchell (or Green Mountain) might be applied to Space 6, and would fill it quite well, except that it is too green and too subject to black rot. Niagara might fill the same space (6), and would do fairly well in size, productiveness and vigor at the north, but it is not quite good enough (too foxy), and the skin is too tender for long shipment. And so we might go on through the list and find vast room for future work in originating better varieties and many to occupy spaces yet vacant.

The next question is, what material have we from which to create these needed varieties?

It is very certain that the *Labrusca* varieties alone can never fill the diagram, neither can any other one species; neither can *Labrusca* and *Vinifera* jointly, as will be apparent when you apply all the known simple and hybrid varieties of these; neither can *Labrusca* and *Riparia*, which would take in addition the *Labruscas* in our catalogues and all the *Labrusca* × *Riparia* hybrids, such as Clinton, Taylor, Elvira, etc.; neither *Labrusca*, *Riparia* and *Vinifera*.

But add the large-clustered, large-berried *Vitis Linsecomii*, and we go forward at once to the medium and later seasons, and fill better many of the already partially filled spaces. *V. æstivalis* and *V. Bourquiniana* join well in the work. So will *V. Champini*, *V. Doaniana* and *V. rupestris*, among the extra-early and mid-season varieties for the south, and finally the *V. rotundifolia* will come in for a share in the subtropical Gulf regions. *V. Solonis* in the hot south-west will take the place of the sprightly *V. riparia* of the moist cold north-east. No one generation of simple or hybrid varieties will do the work. It will require generation upon generation, combination upon combination.

I have found that grapes of a certain color, as of red, yellow or black, yield a great majority of their own color in their progeny, and especially so if such colors are crossed or hybridized together, as naturally would be expected; hence, in breeding for color, use only parents of that color if they possess the other desired properties. A careful study of material in hand in connection with above general considerations will lead readily to the minute study of special qualifications; such, at least, has been my experience.

The Cypress-tree of Tule.

ON page 125 of this issue is the portrait of the Cypress-tree of Santa Maria del Tule, made from a photograph, for which we are indebted to Baron Thielmann, the German Ambassador at Washington. This tree stands on the grounds of the little church in the town of Tule, on the road from Oazaca to Guatemala, by way of Tehuantepec, and is the largest of the Mexican *Taxodiums*, and perhaps the most famous tree in the New World. According to a note in the eleventh volume of Sargent's *Silva of North America* its trunk at five feet above the ground, according to late measurement, has, in following all its sinuosities, a circumference of 146 feet, while the actual girth is 104 feet, the greatest diameter being forty feet and the least twenty feet. Its height is estimated to be 150 feet, and the spread of its branches is 141 feet. As measured by Baron Thielmann last autumn its height was between 160 and 170 feet and its largest diameter forty-two feet. This tree is believed to be two thousand years old. It was mentioned by Humboldt, and his name is inscribed on the bark.

In the third volume of this journal the portrait of another of these wonderful Mexican *Taxodiums* was published on page 155. This was the Cypress of Montezuma, the largest of the great Cypress trees in the gardens of Chepultepec, near the City of Mexico, and a noted tree nearly four centuries ago. The Cypress of Montezuma is a tall and still graceful tree, 170 feet high, with a trunk to which travelers have ascribed a girth varying from forty to nearly fifty feet, these discrepancies being due, no doubt, to the different points above the surface of the ground at which they were made.

The Mexican *Taxodium*, although it grows to a much greater size, is specifically almost identical with the *Taxodium* or Bald Cypress of our southern swamps, being chiefly distinguished from that tree by its autumnal flowers and by the persistence of its leaves, which do not fall in the autumn, and, although most botanists now consider it a distinct species, it may on further investigation prove to be only a geographical form of our tree.

The Flower Industries of Southern France and Paris.

FROM December till May is the season for the flower industries. It is only within the last fifteen years that the commercial culture of flowers in France has attained its present large proportions. The area now devoted to flower-farms, where entire fields, not beds, are cropped with the most lovely and odoriferous flowers, lies in the area twenty by ten miles in extent which takes in Cannes, Nice and Grasse. The climate as well as the soil are especially suitable to the enterprise in question. Subdivisions of the area have also their peculiar floral outputs. Cannes, Nice and Antibes are reputed for their famous Roses; Grasse for its Jonquils, Violets, Tuberoses, Jasmine, Mignonette; Hyères and Fréjus, for Violets; the suburbs of Cannes, for Pinks. Bulbous plants succeed everywhere.

In the matter of profit, the districts of Antibes and Cannes rank first; excellent outputs are also secured about the Golfe de Juan and Beaulieu. The total area actually cropped with flowers is nearly 1,800 acres, of which the commune of Nice represents 500, and Cannes, Antibes, Mentone and Grasse each 250 acres. The villa residences commence to encroach on the flower lands, but the house proprietors themselves grow flowers, and that, with letting their villas, helps to make up the means of living. The very large growers of flowers resemble, it may be said, large farmers; they sell their produce to the laboratories or to contractors, or they enter into partnership with intelligent laborers and divide profits. In the winter season the culture is confined to the raising of cut and ornamental flowers. In summer the aim is to cultivate for the laboratories—that is, to distill for perfumery, to prepare essences, pomades and scented "waters"; it is also the season for harvesting seeds.

It is a popular error to suppose that no skill or outlay is required to produce the supplies of flowers for northern latitudes between Christmas and May. Flower culture exacts capital and increasing care. Doubtless many conclude that the flowers grow naturally in the open air—this is an error; some do, but the most delicate and the most beautiful species are raised under glass. In the regions of Nice, Grasse and Mentone there are 200 acres of land covered over with glass frames, each frame costing at least 7s., so that much capital is sunk in the industry. Other flowers are raised under canvas tents, and many are protected by matting. Roses and Pinks are grown under glass; while white Lilac, Lily-of-the-valley, and also Pinks are forced into bloom in the space of eighteen days. The Lilac is white, because grown in darkness, but when exposed to the sun it rapidly assumes its tints, and no fewer than 200 shades of Lilac have been recorded—a collection the late Monsieur Chevreul never could delineate. It is in the bloom and color-producing efficacy of the sun that much of the secret of flower-farming resides. Violets are generally grown beneath the shade of Orange-trees or under the shadow of walls. The Russian variety is classed first, then the Queen Victoria, which is of a deeper hue.

Flower culture could never have succeeded were it not for the railway companies facilitating the industry. They guaranteed the quickest trains from the south to the north of France, accepting the flowers packed in special osier-baskets, and limited to parcel-post weights, never exceeding eleven pounds. It is thus that Nice and other places supply London, Berlin, Stockholm, etc. None go to St. Petersburg; the parcels, even for the imperial family, are too severely handled while passing through the customs. Germany is the best customer of France for flowers. The prices of flowers depend upon the weather and fashion. Formerly Berlin gave the top prices, now all are on a level; while the cultivators have their own daily latest market quotations published the same as for corn, pork or coal. At Cannes, roses range from 2d. to 7s. per dozen; pinks, 1d. to 4s.; Orchids, 1s. 6d. to 3s.; narcissus that sell at one time at 1d. each, can at other times be had at the same price per dozen. Occasionally taste runs in favor of white, red or yellow colors. During the General Boulanger craze in France, and especially Paris, red carnations obtained

fancy prices, because the favorite flower of the then "hero of the day"; of late these flowers do not sell at all.

Flowers for transport are generally cut before sunrise; the best only are chosen, and are packed with cotton, as in the case of camellias, roses and such Orchids as do not stand the journey, or with tissue paper, or even both. Acacia or mimosa generally lines the baskets.

Flowers, as a rule, are not distilled at Grasse, etc., but the leaves, bark, seeds, roots, etc., of odoriferous plants are. The perfume in the other cases is secured by pressing the petals between layers of suet or lard; when the perfume has been absorbed the grease is dissolved in alcohol, which in turn absorbs the essence. Nice and Grasse work up yearly 800 tons of fat and 500 of oil in the preparation of perfumery. It takes twenty-five tons of rose petals to prepare two and a half pounds of essence of roses, the latter representing £100. In 1892 the railway station at Cannes alone forwarded 900 tons of flowers, valued at £160,000. The profits of flower-farming fluctuate between eight and eighteen per cent.

France alone consumes the moiety of the total of her flower output. Paris is the great consumer; the capital needs perfumes and flowers for its fêtes, weddings and funeral ceremonies. It wishes flowers upon mantelpieces above a blazing fire—for bouquets in the eyes of French people mean gayety. A bunch of Parma violets can glide into a muff, can decorate a buttonhole, or ornament a corsage.

The wholesale market of Paris, with which the writer only deals, is held in the central cross alley of the Halles Centrales. In summer—April to September—the hours are 3 to 8 A. M.; in winter, 4 to 9. The right-hand side of the alley is reserved for the flowers from southern France, as delivered by the railway vans; the left side is allocated to the floriculturists of Paris and its suburbs, who have forcing-pits and greenhouses of their own. There are about thirty-two licensed retail sellers, who pay 4d. for their stand of as many hours. There are two sworn auctioneers, who give security each for £400; their fee is five per cent. The thousands of small baskets from Nice, etc., of four to eleven pounds weight, are sold by the dozen; if possible, the same kind of flowers are disposed of simultaneously. Then there is in the distance a regiment of hawkers, who come to buy from the auction salesmen; they have a handcart, which they hire for 6d. a day, paying 2d. more for the liberty to trundle along the streets; these are the subaltern distributors of the floral harvest.

In addition to the special "local" flower markets of Paris, there are 230 fleuristes—there were only forty-five in 1870—or flower-shops, that have magnificent contents along the leading boulevards and main thoroughfares. Their windows are often marvelous displays of floral wealth, united to art. The contents of each window constitute an object-lesson in the harmony of colors, in the arrangement of shades and of volume, of flowering plants [the taste is sometimes questionable, witness the large ribbon bows and satin streamers intermingled]. What wreaths, what bouquets, what painting of the Lily! All is the work of the special lady shop assistant, known as the coloriste; she receives £12 per month for merely dressing the window and inventing combinations for bouquets. The fleuristes in Paris are wealthy, like their customers, who command bouquets and plants varying from £4 to £20. Many of the fleuristes have their own greenhouses in the suburbs, and take by contract what is most beautiful for sale by private growers. They possess every flower "out" of season, of the very newest variety, with the freshest of bloom, and displaying the brightest colors.—Edward Conner, in *The Gardeners' Chronicle*.

Foreign Correspondence.

London Letter.

IRIS ROBINSONIANA.—English growers of plants for furnishing purposes have been attracted by the elegance of habit and rich green foliage of this Iris, of which a figure was published in *GARDEN AND FOREST*, vol. iv., 352, prepared from a large specimen which flowered in a sunny greenhouse at Kew. It possesses in an exceptional degree those characters essential to a good furnishing plant, its leaves being far less stiff and better in color than the New Zealand Flax, *Phormium tenax*, which has been tried again and again by market-growers and has always failed to "catch on" with furnishers, owing to its stiffness. The Iris is easily grown in a greenhouse, and as it ripens seeds in abundance a stock of it can be quickly obtained, or it may be propagated by means of division, as it is very prolific of

basal suckers. It will be remembered that this is the "Wedding Flower" of Lord Howe's Island, the home of the Kentias, and that it is by far the largest of all known Irises. It bears tall branching panicles of beautiful white and gold flowers.

PHÆDRANASSA CHLORACEA.—When properly treated this is one of the most charming of bulbous plants, and a useful plant for the conservatory. It prefers a sunny greenhouse, a loamy soil, a fair allowance of water while growing and absolute dryness when at rest. The leaves, which are produced with, not after, the flowers, are like those of *Eucharis candida*, but longer in the petiole, and they are covered with a glaucous, almost pale blue bloom, like the bloom of the damson. The flower-scape is erect, eighteen inches high, and it bears an umbel of about a dozen drooping tubular flowers nearly two inches long with acute segments, their color being a beautiful combination of scarlet and blue-green. The plant belongs to the same category as the *Urceolinas* and *Callipsyche*. It is a native of the Peruvian Andes up to 12,000 feet. It is sometimes catalogued by the Dutch bulb dealers, but it is rarely seen in English gardens, although eminently worthy of a place in all good collections.

DRACÆNA ANGUSTIFOLIA.—Some young plants of this Malayan species are now attractive in a stove at Kew by reason of their large arching branched panicles of white flowers, which are sufficiently attractive to place this species among flowering stove plants, an unusual character in the genus. The Kew plants have erect, unbranched stems eighteen inches high and a quarter of an inch thick, leafy to the base, the leaves bright green, narrow, a foot long. The panicle of flowers springs from the top of the plant and is two feet long, branched, the branches nine inches long, the whole clothed with narrow tubular flowers nearly an inch long. According to the description of this species in Hooker's *Flora of British India*, it forms a stem eight to ten feet high, as thick as a stout cane, simple or forked, the leaves sometimes twenty inches long, the panicle very large, the flowers white or tipped with pink, and the fruit half an inch in diameter, fleshy and orange-colored. It is a true *Dracæna*, not a *Cordyline*, and is a native of Australia as well as India.

CROTALARIA LONGIROSTRATA.—We obtained this plant from seeds sent to Kew by Mr. J. N. Rose, of the United States Department of Agriculture, in 1891. It is now one of the most useful of shrubby legumes grown in pots for the decoration of the greenhouse in winter and spring. Cuttings are struck annually in a stove and the plants are grown in a sunny frame all summer along with *Poinsettias*. They form shapely little shrubs about two feet high, with pinnate leaves of a soft green color, and long-stalked, erect racemes of bright yellow flowers about the size of those of the common Laburnum. Planted in a bed out-of-doors in June a batch of plants made healthy growth, but did not flower. In subtropical climates where the atmosphere is fairly dry it would probably prove a first-rate shrub for the open. Of the several hundreds of *Crotalarias* known very few are of any value as decorative plants. *C. juncea*, the Sunn-Hemp, sometimes develops with us into a presentable shrub, and its golden-yellow flowers are decidedly ornamental.

COLUMNÆA SCHIEDEANA.—This is a large-flowered, attractive stove-plant two or three feet high, with fleshy stems, lanceolate dark green leaves four inches long, and axillary clusters of stalked, tubular, two-lipped flowers three inches long and colored dull crimson and brown, the conspicuous calyx being bright red. It is easily grown, requiring similar treatment to shrubby *Begonias*, and it flowers freely in February and March. The genus is a near ally of *Alloplectus* and *Drymonia*, and it is said to contain about sixty species, all natives of the tropics of the New World. Only very few, however, of them have ever been introduced, and perhaps not more than three or four are in cultivation now. One of the most striking is the Colombian *Columnæa Kalbreyeriana*, with a short stem, large leaves and clusters of bright yellow flowers. *C. Schiedeana* was introduced

from Mexico many years ago, and was figured in *The Botanical Magazine*, t. 4045. It is cultivated in continental gardens under the name of *C. erythrophæa*.

DIDYMOCARPUS HUMBOLDTIANA.—This is a tropical representative of the Pyrenean *Ramondia*. It is, therefore, too small to find general favor among cultivators of showy things only; nevertheless it deserves a place among choice tropical plants. It is by far the most tractable under arti-

branched peduncles rise to a height of three or four inches and bear numerous broad-tubed Gloxinia-shaped flowers nearly an inch long and colored pale purple in the type, white, with a blotch of yellow in the variety *alba*. It has been flowering since last autumn, and is now ripening seeds. It is a native of Ceylon. There are about seventy species known, all natives of tropical Asia.

PRIMULA OBCONICA ROSEA.—This is a considerable improve-



Fig. 15.—The Cypress-tree of Tule.—See page 123.

ficial treatment of all the species of *Didymocarpus* that I have tried (*D. Malayana*, Messrs. Veitch's recent introduction, I only know from experience with small seedlings up to the present), for it grows and keeps healthy when kept on a shelf in a warm house and treated the same as *Gloxinias*. It has broadly elliptic, wrinkled, hairy leaves three inches long, which lie flat on the ground, *Ramondia*-like, forming a tuft, from the centre of which the slender,

ment upon the type, both in regard to the size and color of its flowers. Messrs. Ware, of Tottenham, exhibited a batch of it in flower at the last meeting of the Royal Horticultural Society, from whom it received a certificate. It has large, well-formed trusses of flowers, each an inch across and colored clear rosy pink. Along with it were well-grown examples of the type and of the variety *grandiflora*, the flowers of which are pale lilac, almost white in fact,

when developed in a little heat. Ever since its introduction from China in 1882 cultivators have been striving to cross this species with other good garden sorts without any definite result having ever been obtained, but it appears likely that variety, in both size and color of flowers, is being gradually evolved solely by high cultivation and selection. There is, for instance, a marked difference between the best forms of this species as now known and the type as represented in *The Botanical Magazine*, t. 6582.

CYCLAMEN PERSICUM AGAIN.—Two additional sports have been recorded this week, namely, an exceptionally large-flowered pure white form, named *Grandiflorum album*, the petals being broad and measuring nearly three inches in length. It was shown in magnificent condition by the St. George's Nursery Company, Hanwell, and was awarded a certificate by the Royal Horticultural Society. The second is a red-flowered variety of the sport with crested petals which originated in a garden in France three years ago, and is reproduced from seeds. It will be remembered that Messrs. Low & Co. have raised a white-flowered variety with crested petals, and this also comes true from seeds. Dr. Masters suggests that these sports are due to hypertrophy or overgrowth, caused by excessive feeding, and that they may be looked upon as a "variation formed as it were beneath our eyes, and one, moreover, which in so far resembles a species that its characteristics are reproduced from seed."

London.

W. Watson.

Plant Notes.

IRIS ROSENBACHIANA.—Some mild day in March, or even in late February, if genial conditions prevail, there will be seen rising from the bare earth a short cluster of leaves about the size of a finger-tip. Very shortly after, this Bokharan Iris will expand its fair, not to say gaudy, flowers, fully unrolling in a few hours after it shows color. In the early year flowers are either short-stemmed or sessile, as if they feared to trust themselves too freely to Nature's buffetings. It is only as the season advances that the leaves and peduncles expand to produce bolder effects in the garden. Even the bold Daffodils send the smallest and daintiest of the race as a courier, and *Narcissus minimus*, which now appears as usual, is scarcely as large as a *Snowdrop*. The early Irises have but small flowers and show not much foliage, and this is linear. The best forms of the *Reticulata* section are modest in size as well as color, *I. histrioides* being the most prominent for mere inches. Much more showy than any of these, though little exceeding them in size, is *I. rosenbachiana*, which begins to show itself before the smaller Irises have passed. This has an ovoid bulb with short perennial (or perhaps persistent) roots very much thickened where they join the bulb. Botanically it is of the *Juno* section, one of the most striking of its characteristics being the very small standards, which are a perfect antithesis to the bold standards of the German Irises. The flowers have very long tubes; long narrow styles, still narrower claws and a short vividly colored fall. They are said to vary materially in coloring, from white to shades of purple. Those in my garden are light purple, shading to white, except on the falls, which are a rich reddish purple. The flower has a bright orange ridge, bordered to the base of the claw with distinct narrow lines of purple. Away from its surroundings it appears only as a pretty thing, but rising from the bare earth with no foil of foliage under the conditions prevailing in March, it is distinctly gaudy and one of the oddest productions of nature. It is a much taller flower than that of the better-known *I. persica* (also of the *Juno* section), whose coloring is rather of a livid hue, though it always appears to one as a surprising flower. It may be added that *I. rosenbachiana* usually has two, and sometimes three, flowers in succession, bears seeds in this climate, and seems fairly thrifty when planted in moderately light soil, where the bulbs are dry in summer. It has not increased in the three

or four years in which it has grown and flowered here, but it has never failed to flower, and has not degenerated, as summer-resting bulbs often do. Slowness of increase is often more the fault of the gardener than the plant.

Elizabeth, N. J.

J. N. Gerard.

Cultural Department.

Erythroniums.

MR. PURDY, on page 106, speaks none too highly of these beautiful flowers, which are among the daintiest and most graceful of the early season. The cultural directions, so carefully detailed, are very interesting and valuable, and any further comment would seem uncalled for had not Mr. Purdy rather discouraged careless growers or those who are not inclined to take special pains with their plants. Eastern growers do not need any special warning against native California plants, which have a reputation, not wholly undeserved, of being, as a rule, rather difficult subjects to retain in the garden from the fact that they begin to grow too early and that it is difficult to give them their natural rest. However, they are mostly amenable to rational treatment, and most of them fully repay any care required. But my experience with a few bulbs each of half a dozen species of *Erythroniums* which I had from Mr. Purdy three or four years ago, does not bear out the doubt expressed as to their success under other conditions than those noted. My bulbs are planted in the stiffest of clay soils in a border which has had no cultivation to speak of, and certainly no manure or humus for over a decade. They are in the wettest spot in the garden, where water stands if anywhere, yet the bulbs have always flowered, and I notice that they are again showing buds. I doubt if they have increased in numbers, but this does not seem surprising under the circumstances, and I do not know that they naturally increase as fast as our local Dog-tooth Violets, which devote themselves so much to vegetative growth that one cannot in some seasons find a flower on a thousand plants. If they have the same extraordinary underground growth as our eastern *Erythronium*, which, by its lengthening stolons, plants new buds generously in every direction and at all depths, perhaps culture in stiff soil may act as a repression to increase of growth, but be helpful to number of flowers.

These two experiences are only an illustration of the fact that many plants have a great range of adaptability to varying conditions, and that in the garden one may have success with the same plants under widely different cultures. Gardening is very empirical, and cannot be confined to rigid rules. No garden is a true home for all plants, and no grower succeeds with all; in fact, the specialist of a few species is apt to find that as soon as "he knows it all" this is a pride which cometh before a fall, and that any plant may be as capricious as, say, the gentler sex, and more interesting in either case because capricious.

Elizabeth, N. J.

J. N. Gerard.

Fancy-leaved Caladiums.

THE tubers of these plants which are intended for the decoration of the greenhouse during summer should now be started into active growth, while those which are to be cut up to multiply any desirable sort should be selected, labeled and kept in dry sand till a little later in the season. Tubers best suited for the latter purpose are the ones which show signs of starting around the sides, while for growing into plants with large leaves in a reasonably short period, those of a fairly large size without side growths are preferred. To save space for a few weeks the tubers can be started rather closely together in shallow boxes or on benches, with finely chopped moss or rough sand as a cover; but this method, although it saves space, has its drawbacks. The tubers do not all break into growth at one time, some of them being almost in a dormant state, while others are ready to be put in pots; again, the roots are apt to get mutilated in the transfer, which causes a serious check to many of the finer kinds. I prefer to use small pots for starting the tubers, as it is a very much more satisfactory method. Three and four inch pots will be found large enough for the purpose; where three-inch is too large, then two or more small tubers of a kind may be put together.

To grow a plant successfully a great deal depends upon securing thick healthy roots at the start. These roots are produced at the top of the tuber just at the base of the growing leaf-shoot, so that the tubers should be planted deep enough to insure good rooting conditions on the top instead of at the bottom. I find the best potting material for starting tubers to

be of chopped sphagnum moss and well-decayed cow manure in equal proportions; the manure should be put through a No. 4 sieve and the moss through a No. 2. Add a liberal sprinkling of sharp sand, press this material pretty tightly around the tuber and leave a space of at least one inch below the rims of the pots; to keep them in a uniformly moist state a layer of moss can be placed between the pots when standing them on the bench. When they have grown sufficiently for their first shift, some of these high-colored, slow-growing kinds which have recently been sent out will do all the better if a similar compost is used in this operation, but care ought to be taken to have the pots sufficiently drained and the compost firmly pressed. Grown this way they need more water than when grown in soil.

Botanic Garden, Washington, D. C.

G. W. Oliver.

Nelumbiums and Hardy Nymphæas.

THE Egyptian Lotus has gained such an established reputation in this country that every lover of aquatic plants who has any place to grow them aims to have them. Although these plants are perfectly hardy they are rather difficult to establish. This is a good time to plant hardy Nymphæas, and although Nelumbiums are also hardy they should not be treated the same. Most of the Nelumbiums are indigenous to warmer climates than the hardy Nymphæas are, and are more impatient of removal. Many failures have resulted from digging tubers and transplanting them too early in the season, and as seasons vary considerably what is applicable in one state may be fatal in another state, or even in another section of the same state. Some general conditions exist, however, in all parts of the country, but the date of these varies with the latitude. In the southern counties of New Jersey bordering on the Atlantic and on Delaware Bay vegetation is three to four weeks earlier than in the northern part of the state. A similar difference exists in other states, so that the precise time for planting must be judged locally. But it may be considered safe to plant Nelumbiums when there are indications of spring weather, that is, when the early-flowering shrubs, such as the Forsythia, Japan Quince, Wild Cherry, etc., put forth their blossoms, when the grass is not only green, but ready for the mower, and the Dandelions are gleaming on the lawn. These are not harbingers of spring, but declare clearly that spring is here.

In some sections of the country where Nelumbiums are established they have penetrated into deep soil and some are in deep water. These are slow in starting into growth in spring, for it takes a long time for a large body of water to become warmed by the rays of the sun, and consequently the tubers remain in a dormant state for a longer time. Artificial ponds should, therefore, not be too deep, but deep enough to protect the tubers from freezing. Two feet of ice above them will do no injury so long as the tubers themselves are not frozen. In spring the water may be drawn off and a few inches will suffice. When planting or transplanting in spring, dormant tubers, or those already active, are sure to grow under the weather conditions referred to, but if planted while it is cold—and a cold spell often follows the few first warm days of spring—when the tubers have already become excited or started to grow, the check to their growth consequent on the chill will, undoubtedly, prove fatal. In planting Nelumbiums it is well to make haste slowly.

There are numerous varieties of Nelumbiums. The well-known Egyptian, so called; the Chinese; the Japanese of various hues and shades of color, from pure white to deep carmine, single and double; and the native American Lotus, *Nelumbo lutea*. The latter is not as vigorous in this section as the others and is consequently more difficult to establish. The best treatment is to start the tubers indoors in seed-pans or pots, or even in an old pail, and when well established to transplant in permanent quarters. Seed may also be started and grown on in pots and afterward transferred to tubs or planted in ponds, but the seedlings will not flower the first season. Among those of recent introduction a few deserve to be better known and more generally grown. *Album striatum* is robust, vigorous and free-flowering. The flowers are large, pure white, flaked and margined with crimson-carmine; sometimes this coloring is slight, and at a short distance the flowers appear pure white. They have exquisite fragrance. *Kermesina* is not so robust, but is vigorous and free-flowering and equals *N. speciosa*. The flower is a delicate shade of carmine-rose. *N. rosea* is also of good constitution. The flower is bold and massive and the deepest rose-color of any in cultivation.

Hardy Nymphæas may be planted two or three weeks ahead

of Nelumbiums and should receive attention first. Yet these may be planted any time during summer, and as late as the first of September in warm sections. The season for flowers will be short, however, if there are any flowers at all, but an advantage is gained for the following season. The great improvement of varieties and the addition of new ones make them highly valuable as hardy decorative plants. Only a few years ago a hardy pink variety was a valuable novelty and limited in distribution; but now this class embraces all the deep rich reds of the tropical varieties, and in some instances they are unsurpassed. The blending of colors in these charming flowers baffles description. Among those within reach of most cultivators and deserving of mention are *Nymphæa Marliacea carnea*, *N. Marliacea rosea*, *N. Laydekeri rosea*, *N. Laydekeri purpurea* and *N. lilacea*. Among those that are yet scarce, and consequently high in price, are such superb varieties as *N. Robinsoni*, *N. lucida*, *N. flammea*, *N. ignea* and *N. fulgens*. These are fiery crimson, orange-scarlet and purplish maroon, with intermediate shades unsurpassed by any other class of hardy plants.

Riverton, N. J.

W. Tricker.

Soils and Potting.

AT a recent meeting of the Massachusetts Horticultural Society, Mr. T. D. Hatfield read a paper on the above title, and we quote from an abstract of it which appeared in the *Evening Transcript*, of Boston:

Gardeners seldom agree entirely about the proper soil for any crop. Soil may be heavy or light, the land high or low and with much variation of exposure, and we often wonder at our neighbor's success under conditions where we should consider failure certain. An acquaintance of mine, a gardener at Cape Ann, told me that the only potting soil he could find was turf from what had once been a salt marsh. After it had been broken up and exposed to frost and air he found he could grow almost anything in it.

We gardeners believe in "leaving well enough alone," and there are methods which we continue because it is the custom, though we cannot explain why. We read in old books, "one-third turfy loam, one-third leaf-soil and one-third sand," or it may be fourths, including rotted manure, or four-fifths, with peat added. This accurate measuring, however, is slow, and but few such mixtures of soil are in use to-day by men who have left off obeying the rule of thumb and have taken lessons in the school of experience. Leaf-soil, one of the best ingredients in any compost, is seldom used except in private gardens. Well-rotted manure is a good substitute. However, the soil should be light for potted plants and there is less danger from overwatering with the hose. Rose-growers always find means of meeting the wants of the soil. They may add clay, but can generally do without it.

With Azaleas it used to be considered necessary to use English peat, and ninety per cent. of these plants are still so grown in England. But look at the Azaleas grown by Mr. Sander, gardener to Professor Sargent, of Brookline, and you will see that Azaleas can be grown in soil almost wholly lacking peat.

There are other considerations almost as important as the soil and its consistency. For *Gloxinias* I tried various kinds of soil to little advantage. With these plants much depends on caring for the tubers during the so-called resting season, though they are never absolutely at rest, and it is a mistake to remove them and store in dry sand. They should never become thoroughly dry, for living shoots will always be found which require some nourishment. Start with sound, healthy roots, withholding water until some leaf-growth is made, and keep them near the light, and then *Gloxinias* will succeed in almost any soil.

I have but one compost heap. Good turfy loam is not plentiful, and some of us have found how to get along without it. Old Country Carnation growers are extremely carefully in mixing their potting soil, but the American grower prepares his in the field without a foot of turf. The best method is to cultivate the area for stripping, growing thereon a crop of clover with no other object beyond turning the best of what is put into the soil as manure into plant-food of the kind which the Carnation most needs. The American grower raises the better Carnations, though it is true he has better light during winter-time, has made a specialty of the work, and has originated a new type of the plant. This shows that the importance of a prescribed composition for soil is overestimated. I have grown *Chrysanthemums* in soil from the common compost heap which were just as good as those grown in special soil.

In the spring there is generally turf trimming to be done, and I used to get enough in this way for a season's use; but

now if I get a half-dozen cartloads of turf I mix it with two loads of the best manure—sheep-manure is preferred, as it is richer, so that less is required. This I put in layers alternately with pure ground bone; fermentation starts and the soil is heated to 120 degrees, Fahrenheit, which will kill all insect-life and weed seeds and make the bone meal available as plant-food. Bone meal should be worked into the compost long before it is needed, as it is not fit for use until fermentation has subsided. It should never be used as a top-dressing. I have said that light soil is best for potted plants, but a man may get along with heavy soil if he understands its management. Injudicious watering will lessen the value of the best compost, and lack of air and of proper heat and moisture would ruin the best plants.

In potting plants clean pots are a necessity. If new, expose them to a rainstorm, or else fill with moist earth and leave for a day or two to deodorize them. This earth should not be used again. Next in importance is good drainage. The best material is crocks of broken pots. Coal ashes, though excellent for many plants, is bad for others. Plants which do the greater part of their growing in winter-time, as well as those which remain a long time without repotting, require most care. All potting should be done firmly and for the most part by hand. Plants which grow quickly, Geraniums, Heliotropes, Coleus and Fuchsias—what gardeners call soft-wooded plants—need less care. Amateurs often put out their window-plants for a summer's growth, and it is pleasant to see how luxuriantly they grow with unrestricted root area, fresh air and sunshine. But in winter again they must be pruned and curtailed in root-room. Geraniums and almost all window-plants stand this rough treatment. I, myself, should prefer to dispense with old plants, having raised a lot of young stock in the mean time.

Amateurs often ask what fertilizers to use for potted plants, when all that is needed is better light and air, or more or less heat. The best of liquid manures for potted plants, to continue the productiveness of flowers or fruits after the natural resources of the soil have been exhausted, is the dregs from the barnyard. It is well to start with one-eighth strength and increase as experience dictates. Colorado sheep-manure may be used at the rate of a peck to fifty gallons of water. Sulphate of ammonia and nitrate of soda, at the rate of one pound to fifty gallons, furnish nitrogen in a form easily assimilated, and their action is quick of benefit as well as of injury. These should only be given in such quantities as the plant can digest. Even if a surplus did no injury to the plants it soon leaches away and is lost. Liquid manures should be used only on healthy plants, and free drainage must be secured at all hazards.

Azalea Indica.

MOST of the varieties of Indian Azaleas which are generally brought into flower for Easter are now beginning to show their colors. It is usually somewhat difficult to keep them back until this time even in the coolest possible quarters, but this year they seem to be developing so as to be at their best at the right time. The weather, which until recently has been somewhat dull and sunless, has doubtless had a retarding influence. The most forward of all the varieties is the pure white *Deutsche Perle*, which is generally the first to flower. The buds on *A. Indica alba* are also well forward, and while this old favorite is less popular than the newer sorts, it has not yet been excelled for freedom of growth and flower, and we still value it as a useful variety for cutting. *Apollo* is another good white variety of the older sorts, and its flowers are among the largest. *Louisa Pynaert* is also white, and unrivaled in purity and substance, but somewhat shy in flowering. *Imbricata*, a white variety flaked with rose, on the contrary, is more inclined to make flowers than growth. Other good varieties, old and new, are *A. Borsig*, *Ami du Cœur*, *Bernhard Andre* and its white variety, *alba*, the double-flowered *Camellie*, *Candidissima*, *Flambeau*, *Madame Camille Van Langenhove*, *Madame Iris Lefebvre*, *Madame Van Houtte*, *Pharilde Mathilde*, *President Oswald De Kerchove*, *Princess Alice*, *Theodore Riemers*, *Stella* and *Vervaeana*. These varieties are very numerous, and these are only a few of the best of those with which I have familiar acquaintance.

One of the points of cultivation which should be attended to now is the pinching out of all young growths as they appear alongside the flower-buds. If these are allowed to grow, the flowers will be quite worthless. They appear on most plants at this time, no matter how carefully they may have been cultivated. They are often induced by feeding after the buds are set. This is a mistake and should be avoided, though fre-

quent applications of weak liquid-manure may be given while the plants are in active growth; the inducement of soft growth must be guarded against. Syringing is important in maintaining the vigor of the foliage, and it also helps to keep in check such troublesome insects as thrips and red spider.

We find that planting out after the beginning of June is the simplest and most convenient method of summer cultivation, unless for large plants. A liberal supply of leaf-mold should be worked into the soil where they are to be placed. Watering is, of course, necessary during dry weather, but it is easy to maintain an even moisture about the roots of the plants under this treatment as compared with the former practice of plunging the pots. We like to see the buds well set before lifting in fall, but it is better to lift a little early rather than incur danger from freezing.

Tarrytown, N. Y.

William Scott.

Correspondence.

Is the White Pine Doomed?

To the Editor of GARDEN AND FOREST:

Sir,—I have read with interest the very ingenious and highly philosophical, yet rather unnecessarily forced and, I believe, erroneous explanation which Professor Corbett advances in your issue of March 24th for the difficulty which the White Pine seems to experience in reproducing itself, namely, because, with the Coniferæ in general, the Pines are "less highly organized" morphologically, they are "less virile than many of their competitors," and "more congenial conditions for growth and development must be provided for them than for other species with which they now have to contend." And finally he states that "the White Pine requires extra care to induce it to perpetuate itself." These statements might be misconstrued into meaning that the Pines are more fastidious than other species regarding conditions of successful reproduction. This would be a grave mistake, for, on the contrary, the Pines, of all trees, are among the most frugal, able to exist, and even thrive, in the poorest and driest soils and climates, where no other trees will. Is it not the tree of trees for sand dunes? Does not *Pinus rigida* maintain itself in the most forbidding gravels and sands of the Jersey plain? Is not *P. Virginiana* the very emblem of frugality? Does not *P. Tæda* immediately take possession of the abandoned southern fields, keeping out all competitors and wrestling even in the swamp for supremacy? Do not *P. edulis* and *P. ponderosa* occupy the driest slopes and exposures of the Rockies, and does not the latter range from arid southern Arizona to humid British Columbia, showing a most remarkable adaptability which few species share? Is not *P. Banksiana* the most frugal inhabitant of the northern Pine lands, and does not *P. resinosa* thrive in the swamps of Minnesota as readily as in the dry gravels, showing hardly any difference in the rate of growth? And the White Pine is no exception to the rule—nay, if anything, it is even more adaptive in certain directions.

Within its climatic range and even beyond its natural limits of distribution it occupies, or may be made to occupy, the greatest variety of soils, and may be propagated with the greatest ease. That there is no more difficulty than with most other species in regard to its spontaneous reproduction, if the chances are even, may be seen in the hill country of Massachusetts, as well as in the true Pine country of Wisconsin and Minnesota. Wherever an opening large enough is made young seedlings quickly appear and find no difficulty in maintaining themselves against broad-leaved competitors, if only the fire did not come to the aid of the latter. For these have one advantage in their constitution over the Pine and one only, namely, that they can sprout from the burnt stump. As to their seeds, contrary to Mr. Corbett's supposition, it is well known that those of the Pine retain their germinative power much longer than many and as long as most broad-leaved species. To be sure, the observed deficiency in the recuperation of the White Pine growths is, as Professor Corbett suggests, due to unfavorable conditions, but these are entirely extraneous and not inherent in the constitution of the Pine or its seed. Any other species treated in the same way would and does react similarly. Even the White Oak, most tenacious of life, can be almost exterminated, as some parts of Kentucky testify. Cull out all or most of the old White Oak in a mixed forest, leaving all other species to shade the ground and to compete in much larger number for the openings and you will soon miss all reproduction of that light-needing species. Thus, it is the culling of the Pine, reducing their number as compared with its competitors, and the leaving of these to

shade the ground, which reduces its chance for reproduction in spite of its considerable shade endurance.

Not special care, but merely giving an even chance for reproduction, is needed to recuperate the White Pine. To be sure, being our most useful timber, it deserves to be given even a better chance by removing such of its competitors as are less useful.

That the explanation of the rotation of forest crops lies mainly in the relative shade endurance of the species and the variation in light conditions produced either by the action of man or of nature, is too well established to require any other explanation.

Washington, D. C.

B. E. Fernow.

The New Forest Reserves.

To the Editor of GARDEN AND FOREST:

Sir,—Will you allow an Englishman, who has seen with his own eyes in many western states the frightful devastation of the most magnificent heritage of the American people, to congratulate you, as editor of GARDEN AND FOREST, on the success of your patriotic and wise efforts, continued for many years, to preserve some part of those unrivaled forests in a state of nature. I do not think that any act of the late Presidents will have such good and lasting results as this, if effectual measures are taken to protect the new reserves from fire, grazing and the reckless slaughter of game, which has been so detrimental to them.

I cannot help thinking that until a permanent staff of competent forest officers can be trained and appointed you will find that detachments of the regular army under selected officers will prove the most effective and honest guardians of the reserves, and though the areas defined are small enough in comparison with the vast areas which are already either wholly or partially ruined, yet the step just taken is one which goes beyond what could have been expected at the present moment. There still remain, however, some regions in which similar reserves seem to be almost as much wanted. Among them I might mention a district in north-western Colorado, and another in western North Carolina. It may be too late, but, as an illustration of what we are reduced to here, I may say that our Government is at last obliged to purchase a large tract of land on Salisbury Plain simply because there was no area of open land in southern England large enough for military manoeuvres.

Colesborne, England.

H. T. Elwes.

Exhibitions.

Spring Flower Show at Boston.

ALL the visitors at the exhibition of the Massachusetts Horticultural Society last week agreed that this was, upon the whole, rather better than any spring show yet held by the society, one reason being that such fine weather prevailed at the time of opening that exhibitors had no fear that their plants would be injured by the cold, and therefore they took the best they had. The classes were usually well filled, although there were no competitors for the group of Orchids covering forty square feet. It is rather odd that in the schedule of prizes a date should have been selected for the largest premium on these plants just between the season of their winter and summer bloom. The great masses of Cyclamens, Cinerarias and the varied exhibition of forced bulbs were the leading features of the show as a popular spectacle. The shrubs in flower were also good, although the Indian Azaleas were not up to the highest standard of excellence. There were a few other hard-wooded plants in flower, good Acacias, Epacris, etc., but none of great interest, except from a cultural point of view. There never was so fine a competition of Carnations at a spring show, and the hundred blooms of no less than six varieties, with their foliage, for which William Nicholson took first prize, were exceptionally good, and so were the vases of Ferdinand Mangold, William Scott, Daybreak, Hector and Eldorado, with which Mr. Nicholson took first prize for the best five flowers of a crimson, a dark pink, a light pink, a scarlet and a yellow variety. A new white flower called Freedom, shown by Peter Fisher, was a fine flower, and so was the Nivea of H. A. Cook. The Cyclamens were far in advance of anything previously seen in Boston, and by the great mass of visitors were considered the most interesting of the plant exhibits. There were some fifty plants in twelve-inch pots which took the first prize in various classes grown by John Barr, gardener to Mrs. B. P. Cheney. They were superb examples of culture. The bulbous plants were unusually numerous, conspicuous among which were the Trumpet Narcissus, Tulips and Jonquils of Elwell & Son. In

the fine display of cut flowers of hybrid Roses one shown by David Nevins, called La Rosiere, was as perfect in its color (crimson) as Prince Camille de Rohan, but of better form and fragrance, and it adds another one to the very short list of common Roses which can be satisfactorily forced. Other conspicuous Roses were those of American Beauty, Meteor and Souvenir de President Carnot, for which F. R. Pierson received the first award, besides Bridesmaid and Bride, with which W. H. Elliott took the same rank. A finely flowered specimen of the Crimson Rambler Rose was in the large display of forced shrubs from the Bussey Institution, which included Daphne Cneorum, Lilacs, Kalmias and the like. Noteworthy specimen shrubs were John L. Gardner's fragrant Boronia megastigma and Dr. Weld's Acacia Drummondii, Boronia elatior and Erica Cavendishii. The cut flowers of Camellias from Mr. Joseph H. White were much admired, and they took the mind back to the time when a display of these flowers was indispensable to every spring exhibition. There were about a hundred flowers exhibited, each one with a spray of its own foliage. A cut spray of the double-flowering Japanese Cherry, exhibited by James Comley, was exceedingly beautiful, and received a silver medal from the society. It seemed to be a form of Prunus Pseudo-cerasus, but it differs from any now known in cultivation.

Besides the prize-takers already named, the chief awards for plants were made to Dr. C. G. Weld, the Bussey Institution, Jackson Dawson (for Crimson Rambler), John L. Gardner, James L. Little and J. W. Howard. There was an interesting display of fruits and vegetables, and Jackson Dawson received a special award for some well-fruited Strawberry-plants.

Notes.

Winter beets, turnips, cabbage, carrots and onions are gradually giving place to the new crops of these vegetables from the southern states, Bermuda and the West Indies. Eggplants are coming in considerable quantity from Florida and Cuba, and lettuce from the southern Atlantic coast states. Spinach and kale, from Virginia, are plentiful and cheap. The best out-of-door tomatoes come from Florida, those from Key West being rather inferior in quality. Heavy stalks of Colossal asparagus in full-sized bunches, from North and South Carolina, sell for fifty cents. No cucumbers have come from Florida since the heavy frost there in January until now, when a few crates are being forwarded. Celery finds ready sale, and a choice is afforded in the varying kinds from Florida, California and the interior of this state. Peas and string-beans, some of choice and others of indifferent quality, still come from Florida, the best being hurried northward by express, while the cheaper grades come by freight. One of the most costly field vegetables now in market is Bermuda potatoes; large ones of the new crop cost \$9 00 a barrel at wholesale.

Mr. Robert Simpson, writing to *The American Florist*, says that it is a mistake to feed Roses under glass or other plants of this class abundantly in autumn or early winter, while the plants are small and soft and while the soil is still rich in plant-food, with comparatively few roots to use it. But in the spring, when the soil is full of roots, the sun powerful and the growth rapid, unless nutriment is furnished just as fast as it can be consumed by the plants, small shoots and smaller flowers will be the result. Of course, we cannot take fresh manure from the stable into the greenhouse and use it as a mulch. It should have been heaped up last summer, turned over once or twice in the autumn, and stored before cold weather in a shed or other dry place where it can be reached and handled at any time. In this season of growth the surface of the benches should be sprinkled over with a dusting of finely ground bone or wood ashes, or, better still, with a mixture of both, and this should be covered with a mulch an inch thick of the well-rotted manure and soil mixed in equal quantities. Liquid manure may be omitted for a week after the mulch is spread, otherwise it should be attended to faithfully and regularly, giving it frequently in a very diluted form.

A serious cane-blight of the Currant, which has been attributed to poor soil and hard winters, is really the work of a fungus which is described in Bulletin 125 of the Cornell University Station. The first effect of the disease is seen in wilted foliage and premature coloring of the fruits. Then the leaves dry up and fall away, the berries shrivel and fall, and the bare canes die rapidly. Sometimes the plants die before the leaves unfold, so that unopened buds are seen on the dead branches, and in the worst cases the roots die with the canes. Without giving any detailed description of this fungus, to which allusion has already been made in these

pages, it is enough to say that the mycelium having once gained entrance to a plant may live there for a long time and be transmitted with the cuttings. Cuttings should therefore be taken from plants known to be free from disease, and it is not safe to take them from absolutely healthy plants in the neighborhood of diseased ones. They ought to be obtained from localities where the disease is not present. The best remedy is the removal of the entire plant as soon as the disease begins to be manifest. It should then be burned, because the spores and conidia may be produced on dead plants, and the trouble in this way communicated to the living bushes.

Adonis vernalis is well known as a hardy plant both for the garden border and for rock-work, and if left without frequent transplanting often it soon becomes established and its large yellow corolla, seen above the deeply cut leaves, makes a beautiful show in early spring. *The Gardeners' Magazine* gives an illustration of another species of this genus, *Adonis Amurensis*, which certainly looks as if it would be a worthy companion of the better-known plant. The picture was taken from a specimen in the rock-garden at Kew, where the plant occupies a shaded nook and was blooming at its best about the middle of February. Mr. Watson spoke of it about a year ago in this journal as flowering for the first time in Europe although it has long been known in the east, and no less than twenty-one colored figures, representing distinct garden varieties of it, are published in one Japanese work. There are double and single flowered varieties, some yellow, others orange, others bright red. As they would probably be hardy in this country they might make useful additions to our early-flowering herbaceous plants. This species was discovered in the Amur Provinces of Russia, and it has also been found in the north of Nippon.

The Rural New-Yorker, in reply to the inquiry whether Strawberries should be cultivated in the spring before they fruit, received answers which show that practice in this regard varies widely among experts. Some growers say that one acre when cultivated in the spring will yield as much as two neglected ones, while others feel that it is the wisest practice to leave the mulch between the rows and never touch the ground with the hoe until after the fruit has been gathered. The facts seem to be that during the spring and summer after the plants have been transplanted the roots grow downward to get away from the heated surface to find water. When cool autumn weather comes, fine feeding roots take possession of the surface of the soil and these are the ones upon which the spring growth of the plant depends and which mature the fruit. Of course, hoeing the ground in the spring will kill these roots and reduce the fruiting power of the plants. But after the fruiting season the old roots are useless and the plant begins to send out new ones which again reach downward, and this is the time for cultivating on the surface. In the cool of autumn a second crop of roots takes possession of the surface soil, and if the mulch is left on the ground the next spring these will be the most valuable working roots. Perhaps the men who succeed with spring cultivation are those who keep up rather deep cultivation late in the fall which compels the roots to run deep. In this case the hoe in the spring will find no roots to injure and cultivation does good. Of course, nothing but the surface is hoed, and after the hoeing is done a mulch is laid over the surface and new roots will quickly run through this upper layer to provide food for the growing crop.

Among specialties in the fruit-stores this week is guava-paste from Venezuela, a dry marmalade of agreeable flavor with appetizing qualities, and easily kept and handled, as it comes in square bars wrapped in paper. Packages of one pound cost twenty-five cents, and five pounds are offered for seventy-five cents. Sapodillos, in edible condition, cost sixty cents a dozen. The first mangoes of the season have arrived in a private consignment from the West Indies, and this fruit will soon be regularly in the trade. Large irregular-shaped yams bring twenty-five cents for three pounds. Preserved bananas, a novelty in this market, are seen in a down-town fruit-store. They are entire, peeled, with the flavor of the fresh fruit, brown in color, somewhat toughened in evaporation, and are packed in layers in boxes, to be eaten out of hand. They cost twenty cents a pound. Florida Navel oranges of large size sell for fifty to seventy-five cents a dozen, and the kind known as Jaffa Seedless, with only occasional seeds, and also from Florida, bring an equal price. Grape-fruit from the same state commands \$5.00 a dozen, or fifty cents apiece for large selected specimens. The quantity of Blood oranges seen this season is uncommonly large; this showy fruit comes from Messina and from California. That from the western coast costs fifty

to sixty cents a dozen for the best, or a third more than the Italian fruit; it is more highly colored than that from Europe, has a more pronounced flavor, and is somewhat more acid than the seedling oranges from California. Almeria grapes, carried over in refrigerators, sell at thirty to fifty cents, and foreign hot-house grapes for \$2.50 and \$3.00 a pound with the end of the season in view, though hot-house grapes from Rhode Island will quickly follow the imported ones. California honey, at fifty cents for a quart jar, black currant jam and jelly and three-pound jars of preserved cherries, pineapples and peaches, carefully prepared by private establishments in this city, are among the wholesome delicacies seen in the stock of fruiterers.

Charles Eliot, of the firm of Olmsted, Olmsted & Eliot, died suddenly at his home in Brookline, Massachusetts, on Thursday, the 25th of March, in the thirty-eighth year of his age. He was the son of President Eliot, of Harvard University, from which he graduated in 1882, taking afterward a special horticultural course in the Bussey Institute to prepare himself for the profession of landscape-gardening. After traveling in Europe and studying the best examples of landscape-art in Great Britain and on the Continent he entered the office of Frederick Law Olmsted, with whose love of nature and artistic ideas he was in such full sympathy that he was soon entrusted with the design of works of considerable importance. At the conclusion of his studies he established himself in practice in Boston, where he achieved the success which a self-reliant, though unobtrusive, young man of original faculty and careful training had reason to expect. His greatest public service, however, at this period was the organization of the Board of Trustees for the preservation of beautiful and historic places in Massachusetts. If Mr. Eliot did not originate this idea, he was, at least, the most active promoter of the scheme which is bearing good fruit not only in Massachusetts, but has been adopted in other states, and promises to save from desecration and defacement many spots in different parts of the country which deserve protection for their beauty or patriotic association. Out of this idea grew the plan to save the natural charms of certain well-known places about Boston and unite them into a consistent system of public recreation-grounds, and Mr. Eliot took the lead in organizing the Metropolitan Park Board, of which he was made the landscape-architect. These magnificent pleasure-grounds and parkways, comprising thousands of acres of wooded hills and meadow-land, river stretches and sea views, were largely selected by him, and as they will be developed according to the plans he has outlined, they will make a monument on which an older artist might be content to rest his fame. Four years ago he became a member of the firm where he had received his training, and in a great variety of work he has proved himself one of the most accomplished of designers. He had an intense appreciation of nature, but he always kept up his student habits, examining the outdoor world critically, and reasoning upon what he saw to establish principles which could be applied in practice. He realized the relative importance of natural landscape and of architectural work; he planned with a broad spirit so that he could adapt his rules to buildings and gardens without any danger of over-elaboration on the one side or an affectation of naturalness on the other. He liked system, symmetry and dignity where artificial construction was needed, but no one appreciated better than he what was picturesque in nature, or had a greater reverence for her broad scenic aspects. Mr. Eliot was not only a man of creative faculty, he was, as the readers of this journal know, able to give reasons for the faith that was in him. He had the ability to make a consistent and logical statement of his views and to express them clearly; but, beyond this, he had the gift of expression in a singularly effective style, so that some of his reports are as useful as his designs. The Metropolitan Park Report of 1893, and others which have followed, together with his writings for the press, embody such an amount of sound doctrine, effectively stated, that one regrets that he has not left more of this kind of work behind him. In short, he was well equipped in every direction, and it is no exaggeration to say that his untimely death is an almost irreparable loss to rural art in America, a loss that will be felt more keenly since it follows so closely after that of Calvert Vaux, Henry Sargent Codman and Philip Codman.

Mr. Eliot was a man of the most delicate and refined nature. He was reserved as scholars are, but his elevation of mind and dignity of character were apparent to all, and he had a gentleness of manner and thorough consideration for the feelings of others which won the affectionate regard of all who were familiarly associated with him.

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Early Flowers.

ABOUT the frequent advice given in GARDEN AND FOREST to use more shrubs and herbaceous plants which bloom very early in the spring, remarks that while it is delightful to sit in an easy-chair before a grate-fire and read about gardening of this sort, it has many drawbacks in actual practice. There are sturdy little flowers that will brave the frosts of early March in this climate, but human beings are not quite as hardy as Snowdrops, and it is often impossible to enjoy these where they grow without the danger of contracting influenza or rheumatism. In the slow progress of an English spring, March does not differ materially from May, and the garden is not an utterly inhospitable and unwholesome place in February. But the historic blizzard that we all remember swept down upon us in March, and this is the season when the mud in country roads is hub-deep, while the ground freezes every night and thaws every day, with snow-squalls imminent any afternoon, and with rarely more than a few hours together, now and then, which have in them any warmth or genial promise. In the face of such discomforts it requires some heroic determination to tramp over spongy turf in overshoes to hunt up a flower, here and there, from little plants that have been naturalized in the grass or in a wood border. No doubt, there is some force in this view of the case, and elderly persons of rheumatic diathesis and persons of any age with a tendency to lung trouble would preferably be in Florida or southern California in the very earliest days of our so-called spring. Again, there are many persons who live in cities during the winter, and it may be advisable not to spend much thought on the decoration of home grounds at a season when none of the family can enjoy them, but to reserve all serious effort to brighten up the garden until a few weeks later. But frost and wind have few terrors for the enthusiast who wishes to test varieties of Reticulate Irises or certain new Scillas, *Chionodoxas* and others of the very earliest flowers; and even those who are not enthusiasts, and only care for a few specimens of the species and varieties which will make the most attractive show, are

sure to find a certain distinct pleasure in the cultivation of these very early flowers which the later ones never afford. The very hardships which these daring plants endure arouse our sympathy, their fragile appearance increases our regard for them, and, besides the welcome they receive as the forerunners of the abundant beauty which is to come as the season advances, they have a certain grace and refinement of form and a delicacy and a purity of color that the bigger and more showy developments of summer cannot surpass.

We must repeat, therefore, that, in spite of the many discomforts of the season, every one who lives in the country and has any garden whatever should arrange to make as much as possible of the early flowers, if not the very earliest, and have a spring garden. Many shrubs give a considerable floral display in early April, and these would make an appropriate border for such a garden, and many trees like *Prunus Davidiana*, our Swamp Maples, and a little later on the Redwood would show well in the background. *Corylopsis pauciflora*, with its pale yellow flowers, a relative of our Witch Hazel, is among the earliest shrubs to bloom, and *C. spicata*, which is hardy as far north as Philadelphia, has more showy flowers, with a distinct and pleasing fragrance. The early Jessamine has long arching branches covered with bright yellow flowers, and this, too, is hardy at Philadelphia. The Cornelian Cherry is a neglected shrub which flowers very early, and it is an interesting shrub all the year through, especially in the later season when its abundant cherry-like fruit is well colored. A little later *Fothergilla Gardenii*, a native of our southern Alleghanies, begins to show tufts of long white stamens at the extremities of its branches before the leaves appear. The Japanese *Andromeda*, with its panicles of elegant white flowers, and our still more beautiful *Andromeda floribunda*, both evergreen shrubs, are sufficiently beautiful for any situation. Neither the Yellow-root, *Zanthorhiza*, or Leatherwood has very conspicuous flowers, but they bloom early and would be useful in such a collection, and so would our native Currant, *Ribes aureum*, as well as *R. alpinum* and *R. saxatile*, all of which have handsome and fragrant flowers. For rock-work there is the lovely Trailing Arbutus and the sturdy little Heath, *Erica carnea*, and other shrubs might be named, like *Daphne Mezereum* and the bush Honeysuckles, *Lonicera fragrantissima* and *L. Standishii*, the Forsythias and our native Spice-bush, but these will suffice to brighten the shrub border until *Spiraea Thunbergii* and the great mass of spring-flowering shrubs begin to bloom.

A few of the hardy, herbaceous plants which were brightening Mrs. Dandridge's garden a fortnight ago are named in another column. Mr. Gerard has been telling us for weeks that there are many Irises of singular beauty and effectiveness, not to speak of the hundreds of varieties of bulbous plants which can be counted on for a display at this season. Many of these flowers are the perfection of delicacy in form and color, and they seem all the more satisfying because there are no other flowers to distract our attention or to compete with them for notice and admiration. A little garden of these early flowers in some sheltered spot never fails to please, and when no separate place is provided for them, and they are tucked away here and there at the base of a rock or along a wildwood path, they give us the added pleasure of a surprise as we come upon them unexpectedly. We have so often named the species most suitable for this climate that readers are referred to the indices of former volumes of this journal. Bulbophyllums, Grape Hyacinths, Spring Snowflakes and Fritillarias; Anemones, Violets, Trilliums, Bellworts, Globe Flowers, Adonis, Corydalis, Cowslips, Primroses, Ranunculus, Epimediums, Eranthis, Iceland Poppies—these are the names, in addition to those mentioned elsewhere in this number, which will first occur to one who thinks of a Spring Garden, and most of them are found in many varieties. But what the novice needs most is to make a beginning, and the time will soon come when his anxiety will

not be that he cannot find plants enough for his early garden, but that he has no room for even a small portion of those which he thinks he cannot get along without.

It is a misfortune that the effort to induce the authorities of California to recede the Yosemite Valley to the United States has failed. A bill drawn for that purpose was approved by the proper committee of the California Legislature, but was lost when it came before the House. Perhaps some of the criticisms upon the management of this wonderful valley have been too severe, but its sublimity as a whole, with the delicacy and beauty of its details, belongs of right to the people of the Union, and they do well to be critical when men without taste or training assume to improve such scenery. It is plain that the authorities of California have never realized the fact that the poetic charm of this place has an untold value and that there should be a complete and consistent policy of administration devised by artists in landscape design—that is, by men who not only “have good taste,” as the saying is, but who have studied problems of this kind, who comprehend what are the essential features which it is necessary to preserve, and who know how to treat the controlling elements of the scenery. It is no wonder that the people of the country read with horror that undisciplined men were turned loose at times with axes to clear away the underbrush and chop down trees, or that portions of the land had been leased out to hay contractors and hedged off by barbed wire fences. As we have said before, this scenery, unique for its combination of grandeur and beauty, belongs to the people, and it ought to be controlled by the Government, which represents all the people. There has been a special reason for this since the United States has established a forest reservation sweeping all about the valley and leaving this state property completely isolated. There is still more reason now since the establishment of so many more reservations by President Cleveland, for the increased importance of the reservations will necessitate the establishment of some fixed policy and will hasten the enactment of some sort of law for the government of these great tracts. This is understood as well in California as anywhere else, and many citizens of that state are strongly in favor of the proposed recession. Let us hope that when the measure once more comes before the legislature of that state the restoration of the land to its proper ownership will be accomplished.

The Garden in Relation to the House.

At the meeting of the Royal Institute of British Architects, held on Monday, February 15th, 1897, Mr. H. E. Milner, the well-known English landscape-gardener, and Honorary Associate of the Institute, read a paper on “The Garden in Relation to the House.” As this is a subject which is now interesting both architects and landscape-gardeners in this country as well as in England, an abstract of the paper may not be unwelcome.

Mr. Milner said that he did not propose to set forth a history of gardening in England, but to state his own opinion as to the treatment to be adopted in laying out private grounds, particularly in regard to their more immediate relation to the house, and to indicate generally a practical application of the theories advanced. The utilitarian and necessarily small and formal garden enclosure of the middle ages was spoken of, and its gradual enlargement, until a high state of development was reached under Elizabeth, when the architect who designed the house, laid out the garden as well, with its fore-court and broad terrace, and its straight walks all harmonizing with the building. Yet the garden was still enclosed and little thought given to the treatment of the country outside, beyond the planting of avenues. In the end of the seventeenth century design began to deteriorate, and the ideal sought for was intricacy of parts, repetition and vagaries. Soon came a reaction, and toward the end of the last cen-

tury fashion ruled the destruction of most of the old formal gardens, to be replaced by a no less artificial imitation of nature. The designers, at this time, were not content with amalgamating whatever was good of the old work, with a natural treatment of the outlying ground, or of giving greater breadth to the existing formal work, but swept all this away and replaced it by meaningless walks; by clumps of trees and shrubs dotted irregularly on the lawn and park; by a boundary of planting; by imitation of bits of natural scenery or the introduction of artificial ruins and such like objects, with the desire of making a picturesque landscape.

Mr. Milner then spoke of the happy mean where the art of both schools should go hand in hand, the architect designing the stone or brick walls, steps and terraces, the landscape gardener taking charge of all the arrangements of verdure, and composing the wider picture. The author then pointed out the danger that the liberal art of true formal gardening might degenerate into a mechanical one in which problems are all treated after a certain set rule. Upon this point he said:

It must be borne in mind that places differ much in climate, in soil, in the requirements of the owner, in the amount to be expended, and in the possibility of an extension beyond their immediate precincts. It would, therefore, seem futile to lay down any hard and fast rules for design, for that which would be suitable for a plain would be inapplicable to a hillside; that which would be fitting to a peaty hollow would be wrong on a chalky slope; that which would satisfy the poor man would hardly be deemed sufficient indication of the wealth of a proud possessor; that which would inclose an oasis from the surroundings of factories, might shut off the lovely view of hill, dale and water, and imprison the dweller within a wall—possibly charming in itself, but tiring by restraining the eye from wandering to the unseen and glorious beyond.

In dealing with the details of the site, the approach, the terrace, the garden formation and planting, Mr. Milner spoke of the most advantageous aspect for a house in different parts of England, and his recommendation of a hillside rather than a hilltop for the location of a house is one which we would do well to take to heart:

The approach to a house should always appear to be direct, and any deviation from such directness should not only arise from, but should also be made to arise from, some decided obstacle. By direct is not meant straight. A straight approach requires careful treatment. It is artificial in character; it can appropriately be used when an imposing or somewhat pretentious building is at the end of it, or when the distance is short and when the country is flat. In sloping ground it should, if possible, be made against the slope of a hill. The gradient should be even and flat, or very slightly and continuously curved, otherwise it will appear not straight. If the ground is very undulating, a straight road is out of character with its surroundings. It may be worth mentioning that in laid-out grounds of Tudor times, even where an avenue has been planted, the drive has followed a curved line to the fore-court of the house. A curved line of road is generally to be preferred, for it is more easy of construction, more varied views can be obtained, its gradient can be varied, following within limitations the natural undulation of the ground, and the side slopes can be more easily and freely dealt with than the sides of a straight drive. At the entrance from the public road, and also where the road reaches the house, the route should be nearly level and the line straight. It should rise toward the house when approaching it directly, and it should be level at crossings or junctions. It should not run parallel with the public road with the mere purpose of lengthening the course, or seeming to prolong it, though, when the house is at a much higher level and the object is apparent, this resource must be sometimes adopted.

Having touched upon the engineering of road gradients and construction, Mr. Milner spoke as follows of the lodge and entrance gates and terraces:

These belong to the drive and should be parallel with it and at right angles to it, as distinguished from the highway. The face-line of the lodge should be at least ten feet from the edge of the drive, and its windows should be able to command the entrance and a certain length of drive. On entering by the drive it is advisable to create a good impression, and therefore the difference between the dusty highway and the shaded, well-trimmed drive within the gates should be distinctly

marked. Planting may be introduced on either side of the entrance, but once well inside, a view should be given of the outlying grounds, or stretch of park, or distant wood. A curved drive should not be planted continuously, but broad masses of planting may be introduced, at first to shut off the highway, at turns in the drive, and on the top or slopes of knolls round which the drive may wind.

The treatment of the terrace depends very much on the architectural character of the building. By "terrace" I mean not only the narrow strip of level ground placed parallel with the house, or the more stately portion—often with architectural adornments—that is laid out along the face of the structure, but the whole of the ground that forms the base or setting of the building. A great divergence between the work of English and foreign landscape-gardeners is to be seen in their several methods of dealing with the ground immediately surrounding the house. In England we insist that the treatment of the ground next it shall be artistically formal, with regular lines of turf, wall, slope, walk or bed, all displaying harmony, as far as may be, with its architectural character. On the Continent, with some important and notable exceptions, they surround the house with broad, irregularly curved spaces or walks that have nothing in common with the design of the structure. By one practice the endeavor is to give a base to the building and to create on the contiguous ground an expression of kindred artistic spirit; by the other, the ground is treated as something apart, and a feeling of unrest is created.

Various forms of terrace were then discussed, and Mr. Milner passed on to the treatment of the garden proper, quoting in part from a book of his own, published about seven years ago : *

So many considerations press in to vary general design in the general plan of a garden that arbitrary dealing by imposition of what may be termed paper designs, however ingenious, is ill-advised. The detailed plan should spring from the site as an adaptation of its natural or created features, and should not be, as it were, forced upon the position, crushing it to an artificial scheme. To copy simply the design of another place is inadmissible. Considerations that rule in this connection are almost infinite—extent, geological formation, soil, existing natural formation or features, climate and aspect, the display of distant beauty, conformity to outside influences, particularly to the requirements of the possessor and the expenditure of money that may be made. It is this important variety of modifying influences, and how they are dealt with, that gives charm to each new work of landscape-gardening and to the development it presents; just as we contemplate a fresh work of the kind in pictorial art, and note how the artist has treated the natural features, the colors and tints and their modifying juxtaposition on the canvas. The painter may, indeed, have his rules as to composition, for the use of his colors and the production of his distances. His picture is not a servile copy of nature in its exact details, but an artistic rendering of the effect of nature, as seen by his educated eye and recorded by his skillful hand. His picture, however, is viewed from the same point; but in the natural pictures created by the landscape-gardener the point of view is on every side; there is no back to his canvas. In each position the object should be one of beauty, of interest and of delight, and its relation to other features and to the whole field of the spectator's vision be closely and truly considered. The landscape-gardener must consider that his colors change and grow; he must realize as he creates his picture that in a few years what now seems like a light green stroke of pigment to the painter may have become a tall tree, beautiful in itself, but of altered beauty, either helping or marring the landscape. He follows nature by adapting or garnering her beauties, and tutoring her, so to speak, to a display of them. But by following nature is not meant a slavish imitation or reproduction of any of her particular scenes. Some are unattractive, some very inappropriate; all are subject to dissimilar conditions, and imitation in nature as well as in art produces pettiness. But the spirit of the beauty of nature, embodied as it were in those of her works or features that express her majesty, simplicity, peacefulness, sweetness, repose, refinement, strength, and variety in form, color, abundance, or any of her modifications as parts of loveliness, should be included and brought into juxtaposition in an ideal scene so far as we are able to promote its natural development.

On the grouping of trees for effect, Mr. Milner says :

When the ground is broken or undulating (either natural or created), advantage should be seized of marking the eminences

by planting. Rising ground may be in appearance raised still higher if we cover it with wood. Trees standing singly emphasize falling ground. The brow of an eminence should not be seen above trees. If the brow forms a tedious line, it should be broken by clumps or large masses along its range, and by dividing the line into very unequal parts.

In conclusion, I maintain that we should carry out in the parts surrounding the house the architectural feeling of the design in terraces, walls, steps, basins, beds, and so form a base; that we can still have the dignified and quiet delight of formal work—not a narrow curtailment of the whole design. But I insist that there is in addition a broader treatment beyond—a work difficult to proportion in relation to foreground, to broad lawns, spaces, to grouping and choosing trees and shrubs for effect in size and color, to directing the eye to desired points, to taking advantage of climate and character of the place either natural or acquired, to provision of light and shade in the undulation of the ground, and to a knowledge of horticulture. This art-gardening is, I venture to assert, far beyond the limitations of formal work only, for it can apply the balance and proportion of the matter, and, in addition, present to us a noble conception of art-work, in its execution of outline, surface formation and grouping, and draw into the picture the greater, broader, varied landscape.

Mr. Milner's interesting paper recalls to us the present necessity for remembering that the arts of architecture and landscape-gardening are sisters, not antagonists, and that the work of the architect and landscape-gardener should be done together from the beginning, one supplementing the other, but not, as too often happens, one crowding the other out. The architect is apt to make light of the importance of the treatment of the ground after it passes his own immediate connection with it, and may consider that the landscape-gardener does small justice to the setting of his house. The result can only be satisfactory when the two artists work side by side and in sympathy from the outset, and neither attempting to go beyond his own legitimate limits. There is still too little of this collaboration, and too little sympathy between the professions, each now fearing the interference of the other. It will be a great step in the advancement of both arts when the architect and landscape-gardener shall, as a matter of course, decide on the site of the house together, helping each other to arrange a base for the building; and also when the beauty of broad landscape treatment shall be recognized, as well as its necessity for the completeness of an artistic whole.

New York.

Beatrix Jones.

Foreign Correspondence.

London Letter.

CEPHALANDRA MACKENII.—*Cephalandra* is allied to *Cucurbita* and includes about a dozen species, all African, one, *C. Indica*, known also as *Coccinea Indica*, extending to India and Malaya. They are Bryony-like climbers with perennial root-stocks, angular or lobed green leaves, dioecious, bell-shaped yellow or white flowers an inch across and smooth fleshy drupe-like fruits from one to three inches long; usually of a brilliant scarlet color; they contain a large number of ovoid compressed seeds a quarter of an inch long, broad and flattened at one end. They are usually bitter like *Colocynthis*. *C. Mackenii* is wild in Caffraria, where it scrambles over trees and shrubs and bears large numbers of bright scarlet sausage-shaped fruits three inches long; the leaves are palmately lobed and three inches across. In the garden of Mr. Hanbury, at Mentone, it is a valuable evergreen climber, flowering and fruiting most profusely. Planted against a south wall it covers a space twenty yards square in a few months. I have lately received a box of the fruits from that garden. *C. Indica* requires warm greenhouse treatment at Kew, and probably *C. Mackenii* will thrive with it. Cultivators must not overlook the fact that these plants, being dioecious, must be represented by individuals of both sexes.

SICARA ODORIFERA.—I have lately seen in American papers references to this Cucurbit under the name of "Casabanana," and it is recommended as an edible fruited gourd. It has

* *The Art and Practice of Landscape-gardening.* By Henry Ernest Milner. Marshall Hamilton, Kent & Co., Ltd., London, 1890.

been grown in Europe since 1862, when it was introduced into France from Peru and cultivated with success by Monsieur Naudin, the author of the name. The fruit is cylindrical, four inches long by nearly two inches in diameter, of a rich orange-red color when ripe. It exhales a powerful apple-like perfume, and, according to Sir Joseph Hooker, it is used in America as a preservative against the attacks of noxious insects, both from the person and from garments, etc. But I have never heard of its being eaten. A second species, *S. atropurpurea*, was described and figured in the *Revue Horticole* in 1894 by Monsieur Ed. André, who introduced it from Uruguay. It has fruits five inches long, pale claret-colored when ripe, and apple-scented. Monsieur André recommended it as an elegant green-leaved climber and for cultivation on trellises in southern Europe. The plant grown in the United States as *S. odorifera* is said to have fruits a foot long. Can any one send seeds to Kew of this American plant, the "Casabanana"?

HODGSONIA HETEROCLITA.—This magnificent perennial Cucurbit has been in cultivation at Kew for at least twenty years, and although it grows with a vigor equal to that of wild plants, it has never yet flowered. It is a native of low elevations in eastern Bengal. Sir Joseph Hooker named, figured and described it in his *Illustrations of Himalayan Plants*, tabs. 1-3, where we are informed that its stems grow to a length of a hundred feet or more, climbing the forest trees from which it sometimes hangs and forms a dense screen of dark green plane-like foliage. The flowers are large, red, brown and yellow outside, white inside, about four inches across and surrounded by a hanging fringe of tendril-like filaments four inches long. They are produced abundantly by wild plants and often may be seen strewing the ground in the forests, although the stems are lost in the vegetation above. It is, perhaps, the most striking in flower of all the Cucurbitaceæ, and I call attention to it here as the conditions in the southern states, say California for instance, are likely to suit it better than those of this country.

SNAKE GOURDS.—Several species of *Trichosanthes* are worth including among ornamental climbers for the stove. They grow quickly, seeds sown in March producing plants which will be fruitful in July if grown in a moist sunny stove where their stems can be trained along rafters so that the fruits can hang well in view. It is necessary to see that the female flowers are fertilized artificially, as the plants are usually diœcious. At Kew these and similar tropical Cucurbitaceæ are grown in the same house as the Water-lilies, where they are planted in a narrow border and the stems trained to wires over the tank, where, when the fruits are ripe, they make a striking and novel show, hanging like brilliant-colored snakes from the roof. The best are *T. anguina*, with fruits a foot long; *T. colubrina*, with fruits two feet long; *T. cucumerina*, with fruits like small cucumbers; *T. palmata*, with globose fruits the size of small oranges. They are all scarlet, with streaks of yellow, white and green. The flowers are large, white, with the corolla lobes divided into hair-like filaments.

CRASSULA ALOIDES.—This very interesting new species of *Crassula* has been introduced to Kew from the Transvaal, where it was discovered on hillsides in damp places near Barberton at an elevation of from 2,000 to 4,000 feet. According to Mr. E. Galpin, who sent seeds of it to Kew in 1891, it grows to a gigantic size, with a thick, unbranched, Aloe-like stem bearing a rosette of fleshy, lanceolate, bright green, flaccid leaves a foot or more long, nearly three inches broad at the base, and tapering gradually to a long recurved point; they are much like the leaves of an Aloe, and not at all like any *Crassula* known to me. The flowers are equally remarkable, being borne in a dense corymbose head eighteen inches in diameter on a peduncle three to four feet high, and they are colored cream-yellow. At Kew this plant thrives only when kept in a moist stove and shaded from bright sunshine. No one unacquainted with it would hesitate to call it an Aloe, or some closely allied plant. It excites as much interest at Kew as

Richea pandanifolia, an *Epacris* with the appearance of a *Pandanus*.

PODOPHYLLUM PLEIANTHUM.—This remarkable plant was discovered in the island of Formosa in 1881, and four years later it was introduced to Kew, where it flowered, and was figured in *The Botanical Magazine*, t. 7098. It is a near ally of the North American Mandrake, May-apple or Duck's-foot, *Podophyllum peltatum*, but differs markedly in having a cluster of about a dozen large drooping flowers springing from the axil of the pair of large peltate, lobed, glossy green leaves, and in their deep purple color. Last year some plants of it were placed in a sheltered border outside against a greenhouse, and they have survived the past winter without protection. It is also grown in a cold greenhouse, where it produces leaves a foot in diameter and its odoriferous flowers in August. *P. peltatum* and the Nepalese *P. Emodi*, a pink-flowered species, are grown successfully in the open air at Kew, where they ripen their large bright red fruits in autumn. *P. pleianthum* is a handsome as well as interesting addition to herbaceous plants suitable for cultivation in borders.

YELLOW RICHARDIAS.—Some cultivators in this country have failed with the two yellow-spathed *Richardias*, *Elliottiana* and *Pentlandii*, though treating them as cool greenhouse plants, and others through keeping the tubers quite dry during winter. My experience is that they must have warm greenhouse, even stove treatment, while growing, and when at rest they should be kept in moist soil, as we keep *Caladiums*. All tuberous-rooted Aroids, without exception, are better rested moist than dry; indeed, this treatment is in accordance with the conditions under which they grow naturally. Last year I planted six small tubers of *R. Pentlandii* in a border in a moist stove where tropical Water-lilies are grown, and they grew with exceptional vigor, the tubers being as large as a child's fist when lifted at the end of the season. Our plants were started a month ago in a stove, and they are now growing strongly. With these two exceptions, all the *Richardias* may be grown in an ordinary greenhouse or frame along with such plants as *Pelargoniums*.

London.

W. Watson.

New or Little-known Plants.

Sambucus melanocarpa.

THIS shrub (see illustration on page 135 of this issue), which was long confounded with the red-fruited *Sambucus racemosa* of high northern latitudes in both the New and Old Worlds, was first distinguished by Gray in the *Synoptical Flora of North America** by its black fruits, more convex clusters of whiter flowers and less pubescent foliage. In habit and in the shape of the leaves the two plants are very similar, and it is practically impossible to distinguish them, except when the fruit is ripe.

Sambucus melanocarpa, which attains a height of five or six feet, is common in the northern Rocky Mountains, where it grows near banks of streams and on the sides of moist cañons usually at elevations of from three thousand to eight thousand feet above the sea-level, and flowers from May until July. It is common, according to Macoun,† from the valley of the Columbia, near Donald, in British Columbia, through the Selkirk Mountain region, growing on the beds of snow-slides and in damp thickets. It is abundant in northern Montana and Idaho,‡ and in the Yellowstone National Park in the neighborhood of the Mammoth Hot Springs; and it was reported by Gray as growing on the mountains of eastern Oregon, southward to the Wasatch Range in Utah, in New Mexico, and on the Sierra Nevada of California.

Sambucus melanocarpa has not yet been tried in our gardens, where, no doubt, it will prove hardy.

Mr. J. B. Leiberger has recently separated from *Sambucus*

* l. pt. II., 8 (1884).

† Macoun, *Cat. Can. Pl.*, 539.

‡ Holzinger, *Contrib. U. S. Nat. Herb.*, iii., 229.

Fig. 16.—*Sambucus melanocarpa*.—See page 134.

1. A flowering branch, natural size. 2. A fruiting branch, natural size. 3. A flower, enlarged. 4. Vertical section of a pistil, the corolla displayed, enlarged. 5. Cross-section of fruit, enlarged. 6. A stone, enlarged.

racemosa the red-fruited Elder of the high Cascade Mountains of Oregon and Washington, and has described it under the name of *Sambucus liosperma*,* distinguishing it by its smooth nutlets, those of the red-fruited Elder of the eastern states and of the coast of Washington and Oregon and of *S. melanocarpa* being transversely rugose. C. S. S.

* *Proc. Biol. Soc., Washington*, xi., 40 (1897).

Cultural Department.

Chrysanthemums.

OUR Chrysanthemums intended for specimen plants are now in four-inch pots. We are later than usual this season, as we intend to finish our plants in ten-inch pots. With lessened pot-room the growing season is shortened. When we have used twelve-inch pots we have made the final shift

during May, but this would be too long a season when smaller pots are used to finish them in. By easy stages we shall transfer our plants into the flowering pots by the middle of June. In the mean time the plants will need careful stopping to insure sturdy growth. To get low, well-balanced growth we must begin now to make a foundation. It is not a work which can be arranged by the week or month, but must be attended to daily. There will always be an abundance of leading shoots, and if these are allowed to get away it will be at the expense of the side shoots. A lateral growth is desired at all times, for it is far easier to train the shoots upward than outward.

We pot firmly, but do not pack the soil. Our experience has shown that the roots of large, healthy plants when confined, as they are in pots, increase the bulk so much that but little room is left for water, especially toward the end of the season. Sometimes the roots choke up the drainage, and last season we had to drill holes in the sides of several pots which had become waterlogged. We advise that three holes be made in pots intended for specimen Chrysanthemums; this can be made with a sharp-pointed chisel. In potting it is well to allow at least two inches for water. This makes it convenient to give a top-dressing to some of the less thrifty plants late in the season.

Our stock plants for specimen blooms are still in cold frames. They will soon furnish an abundance of cuttings. All early varieties, such as Madame Bergmann, Marion Henderson and Glory of the Pacific, may be taken during April. May will be early enough for midseason varieties, and June for close planting, where medium-sized blooms only are wanted.

For propagating we use a frame which can be kept closed during bright days, and well shaded. We air thoroughly during the night. Plenty of water is required for the first week or ten days, and the cuttings should not be allowed to wilt.

Wellesley, Mass.

T. D. Hatfield.

Carnation, Chabaud.

SUMMER-FLOWERING annual Carnations are of quite recent origin, and it is only about five years since the Marguerite strains were introduced and accepted with much caution by cultivators, for it did not seem possible that they could be brought into flower from seed in so short a time. There has not been any apparent improvement on the Marguerite strain since its introduction; on the contrary, there seems an even greater tendency to the production of single flowers than when first sent out. I have noticed that a large proportion fail to flower the first season, and it is evident that the strain has not been perpetuated with as much care as it deserves.

The Chabaud strain of annual-flowering Carnations was therefore a valuable addition. These seem to combine all the good features of the older Carnations, such as free flowering, diversity of color, fragrance equal to the indoor varieties, and good yellow varieties occur quite frequently. This is one of the few sterling novelties that cultivators are always seeking, but do not succeed in finding with all their purchases.

Annual-flowering Carnations should be sown early in the year if they can be sown under glass. Treated in this way the flowers will be most satisfactory, but it is by no means too late to sow now, as there will be rapid growth during the brighter and longer days. We made a sowing last December to see how large it was possible to have them and how early in the summer, but another sowing made now will lengthen the flowering period considerably in the late summer months, when flowers are scarce.

South Lancaster, Mass.

E. O. Orpet.

California Garden Notes.

Antholyza Æthiopica.—This is a showy bulbous plant common in gardens of southern California, and it blooms freely during the winter months. It belongs to the Iris family and produces a spike of flowers with foliage like that of *Gladiolus*. It is a native of south Africa, and is commonly known in gardens, I am told, by the name *Watsonia*, a nearly related genus. The spike of flowers is generally over four feet tall, with as many as thirty flowers on one of its two branches, the flowers of a dull brick color or Chinese red, the prominent anthers and markings in the divisions of the corolla of a deep maroon. The flower is more than two inches long and nearly an inch across.

Scilla hyacinthoides.—This *Scilla*, a native of southern Europe and Palestine, is rare in our gardens, but thrives well. Its spike of blue flowers is sent up to a height of about three

feet from a mass of luxuriant foliage, and bears from 100 to 150 or more light lavender-colored flowers, each nearly three-quarters of an inch across. The long spike of flowers opens in succession, and thus remains in bloom for a long period of time.

Leptosyne maritima.—This is one of the showiest of the flowers that bloom with us in March. The luxuriant mass of succulent foliage is surmounted by a wealth of its rich yellow flowers, which measure fully four inches across and possess a delicacy of texture rare in a composite. Its flowers should be popular for cutting, but it still seems not to have found a place in many American catalogues. Its tuberous roots may be easily handled, or it may readily be grown from seed.

Freesia refracta alba.—This *Freesia* has been a disappointment to some of its eastern friends who have tried to grow it from seed, expecting it to blossom the first season, as some catalogues have claimed it will do. In my own experience the character of the soil seems to make all the difference in the results obtained. In some of our mesa soils it makes a better bulb and produces finer flowers in one season from seed than it will in several seasons in our rich valley soils, and only experience can determine its needs in this respect.

San Diego, Calif.

C. R. Orcutt.

American Shrubs for Ornamental Planting.

TWO weeks ago GARDEN AND FOREST published an article entitled "American Trees for Ornamental Planting," which was a summary of part of a lecture delivered by Mr. B. M. Watson, of the Bussey Institute, before the Lenox Horticultural Society. I now send a condensation of what Mr. Watson said of certain native shrubs, repeating what was stated in relation to the trees that this does not pretend to include all the American shrubs which are worth planting. Nor must it be inferred that imported shrubs should be excluded from American gardens, for many of them are very desirable. The aim was to call attention to several of our neglected shrubs, with a brief statement of some of their leading characteristics.

Azalea still remains the popular name for the deciduous section of the *Rhododendrons*. The hardy kinds most generally planted are known as the Ghent *Azaleas*, which are hybrids of our native *Rhododendron* (*Azalea*) *calendulaceum*, a plant of the southern Alleghanies, rather larger than its hybrids and quite as well worth growing for its brilliant flame-colored flowers. When propagated from seed its flowers show a variety of colors. It needs a rich soil and a deep one, with water in summer and some protection in winter until it is established, and then it is perfectly hardy. Our Pinxter-flower, *R. nudiflorum*, is rarely planted, but it is well worthy a place in the shrubbery, for its bright pink flowers, which also vary, widely among many seedlings, are most attractive in the early seasons. *R. arborescens*, also from the southern Alleghanies, has white fragrant flowers slightly tinged with rose, and brilliant scarlet stamens, which appear in early summer. *R. Vaseyi* is a comparatively new plant, but it is rapidly gaining favor, and it is probably the best of all our native *Azaleas* because it flowers so early and is less liable to be cut back in the winter. In growth it is regular and bears an abundance of beautiful pink flowers before the leaves expand. This ought to be a capital subject for the hybridizers. All these plants are now to be procured in abundance at reasonable prices since they can be collected easily in the Carolina mountains. *R. viscosum* flowers in July; that is later than the other species. It is our common Swamp *Azalea* with white flowers and exquisite fragrance. It naturally grows in wet land, but when lifted from the woods it succeeds admirably in the garden.

Baccharis halimifolia sometimes assumes the form of a small tree, and it is one of the few shrubby plants which belong to the great composite family. It is naturally a beach plant, but it grows well anywhere, and is most interesting on account of its good foliage and its numerous cottony fruits in late autumn. Mr. Olmsted has used it largely in planting the Back Bay fens in Boston, where it is sometimes badly cut back in winter, but the annual growth is rapid and sufficient; indeed, close pruning seems to give the best development of its foliage and fruit. *Cephalanthus occidentalis*, the Button-bush, is especially desirable because it blooms late in the summer. Usually found in moist places, it is always thrifty in or near the water, but it grows also in well-drained soils. *Clethra alnifolia*, the Sweet Pepper-bush, is another late-flowering shrub and a charming one, bearing an abundance of snow-white flowers in spikes. It will grow anywhere, even in shade or in poor soil, and is an excellent undershrub. The southern species, *C. acuminata*, makes a pleasing variety.

Besides the well-known Flowering Dogwood, *Cornus florida*, which is a small tree, there are many others of our native Cornels which deserve a place in parks and gardens. *C. alternifolia* is a tall shrub or small tree with a singular and beautiful arrangement of branches. *Cornus circinata* has large, rich foliage; *C. sericea* has dark red twigs in winter and is a delightful addition to the Red Osiers, and all the species have abundant flowers, fair fruit, are easily handled and do well in almost any situation. *Dirca palustris*, the Leatherwood, is a compact shrub of medium height, with small yellow flowers in very early spring, and the peculiarity of its long tough twigs is curious and interesting. *Evonymus atropurpureus*, as well as *E. americanus* and its variety *obovatus*, are not often planted, and yet they are quite equal to the European Burning Bush, which is an old favorite in gardens. *E. atropurpureus* is probably the very best of the genus. *Hammamelis Virginica*, the Witch Hazel, is one of the very best of shrubs for its symmetrical growth and good foliage, while in late autumn, even after frost, its yellow flowers on the leafless branches give it unique value. It is hardly ever planted, and yet where a large and easily grown shrub is required, either for a single specimen or in a mass, the Witch Hazel ought to receive consideration. *Ilex verticillata*, the Black Alder, is among the very best of our plants for bright berries, which remain in good condition from the time the leaves fall until midwinter. Its foliage and habit of growth are both good, and although naturally growing in wet soil it succeeds quite as well in dry. It is easily handled, too. Wild specimens which show abundant berries can be selected, divided and transplanted, or they can be propagated by seeds. The fruiting capacity is improved by cultivation. A yellow-fruited form is now established well in the Arboretum.

Leucothoe racemosa is a shrub of medium size with white flowers in racemes, which are much better on cultivated plants than on wild ones. The chief beauty, however, of this shrub is its dark green leaves in summer, which turn to fine reds and purples in the fall. Associated with *Vacciniums* and *Zanthorhiza* delightful effects in autumn coloring can be produced. *Lindera benzoin*, the Spice-wood or Fever-bush, shows its yellow flowers before the leaves appear, and is interesting for its early bloom. It is a tall, well-shaped shrub with fine dark green foliage and bright red fruit. *Myrica asplenifolia*, the Sweet Fern, and *M. cerifera*, the Bayberry, are both good plants for many situations, and especially useful to cover and hold the soil of slopes on cuttings and embankments, for they will thrive in the poorest soil and under generally unfavorable conditions. The foliage of the Sweet Fern is very distinct, and that of the Bayberry glossy and beautiful, while its fruit is interesting. The Sweet Gale (*M. Gale*) is adapted to the borders of ponds and brooksides, and the color of its twigs is effective in winter. *Nemopanthes fascicularis*, the Mountain Holly, is not at all evergreen as its common name might imply. It is a handsome, much-branched shrub, however, with good foliage and fruit. *Potentilla fruticosa* is a low shrub, bearing loose clusters of showy yellow flowers in summer, and its glaucous green foliage makes a pleasing contrast with other plants in the shrubbery. *Prunus maritima*, the Beach Plum, is another plant which grows well in sterile soils and exposed conditions, especially on the seacoast, since it is sturdy enough to endure the strong winds that blow over large bodies of water. Under more favorable conditions and when well grown it makes a symmetrical shrub of medium size and sometimes a small tree. It is covered with beautiful white flowers just before the leaves open, and the attractive fruit, ranging in color from amber to bright red, is good enough in many individual trees to eat from the hand, and it is also good enough for preserving. *Pyrus arbutifolia* and *P. nigra* are two species of Choke-berries, interesting shrubs of the Rose family, from two to six feet high, which are most effective in masses. The fruit and foliage of the red-fruited form make a happy combination of color in October. The dark-fruited species is a plant somewhat smaller, with fine, glossy deep green leaves, abundant fruit, and is easily grown in sterile soil and in exposed places.

The Sumachs are most desirable for the effect of their foliage in summer and autumn, while the warm color of the fruit and twigs of some of the species gives additional interest to them in the winter. *Rhus Canadensis* (aromatica) is a low bush which almost creeps over the surface of the ground and is well adapted for use on the edge of shrubberies, and is useful in covering exposed banks. Its numerous small yellow flowers appear in early spring, and its foliage, which is always good, is particularly fine in autumn colors. The so-called Dwarf Sumach, *R. copallina*, really becomes in rich soil a large-sized, symmetrical shrub with the brightest of glossy green foliage which turns to brilliant colors in autumn, especially if

it grows in poor soil. *Rhus glabra* makes a little larger shrub than *R. copallina*, and in some ways it is the best of the group, its very long compound leaves making it especially valuable for masses. The Staghorn Sumach, *R. typhina*, is the largest of the genus, making sometimes a tree thirty feet high. It endures pruning well and can be thus kept at any desired height. It is conspicuous, like the others of the genus, for its bold leaves and brilliant autumn colors. All these plants are strong growers and are at their best when massed together and kept by themselves. They make fine backgrounds for other shrubs or herbaceous plants and they succeed anywhere.

Single Roses are now much sought by planters since the introduction of the Asiatic *Rosa rugosa*, *R. multiflora* and *R. Wichuraiana* has called attention to the beauty of our own wild Roses, which had been overlooked. *R. Carolina*, *R. lucida*, *R. nitida* have been extensively planted in the Arboretum, and they are not only interesting for their flowers in summer, but for their bright red twigs and fruits in winter. They, too, ought to be planted in masses, and occasional severe prunings will be beneficial to the stronger-growing sorts and will keep them in good condition. *R. setigera*, the Prairie Rose, is a noteworthy addition to the above group, since it does not come into bloom until July. It is a large plant, and can be grown either as a shrub or a climber. *Rubus odorata*, the Wild Raspberry, is one of our commonest native plants, and is a useful one to grow in shady places. The foliage is not good, but it succeeds where few other plants can grow. *Sambucus Canadensis*, the common Elder, is a striking shrub of medium size and will grow anywhere, and its bold foliage and abundant flowers after the most of our shrubs have passed their bloom make a striking display. Its fruit is showy, too, and has some culinary value. The Red-berried Elder, *S. racemosa*, is also a delightful shrub, with flowers in early spring and bright-colored fruit in summer. These are symmetrical plants when well grown, and are suitable for planting in masses in parks or elsewhere. *Symphoricarpos vulgaris*, the Indian Currant, is one of the very best of shrubs where a low, thick mass of foliage is required. The running stems will quickly produce a verdant covering for sterile soil. The foliage is of the very best, and the slightly drooping habit of the branches makes this plant graceful in the extreme. The fruit is also noteworthy, but not so conspicuous as the white fruit of *S. racemosa*. *Vaccinium corymbosum*, the Swamp Huckleberry, or High Blueberry, one of our most ornamental shrubs, is of sturdy growth and excellent habit. The foliage is good all the summer, and in autumn its color is particularly brilliant, not excelled, indeed, by that of any other plant. The fruit is valuable, though it varies greatly in size and quality, and it seems to be the best of the species for experiments with a view to improving its edible qualities. *V. vacillans* and some of the other *Vacciniums* are also worth planting. *Zanthorhiza apiifolia*, the Yellow-root, is a dwarf-spreading shrub of compact regular growth, with compound leaves of good form and texture, which are particularly beautiful when they turn to purple and yellow in autumn. This shrub can be successfully grown in the shade, and it is a first-rate one to use on the border of a shrubbery to connect the grass with the taller specimens. GARDEN AND FOREST has so often described the American *Viburnums* and advocated their planting that I will not repeat what has been said about them. There are a dozen species, each one of which is effective at some season, and most of them at all seasons. They have good foliage, good flowers, good fruit and good habit. They can all be propagated from seed, although the germination does not take place usually until the second year, and they all improve under care and cultivation.

Lexox, Mass.

E. J.

Scillas and Chionodoxas.

AMONG the early flowers there are none more precious and desirable in the garden than the Scillas and their allies, the Chionodoxas. There is always a woodsy air about these flowers, and I believe they mostly grow in thin woods of deciduous trees. They vary considerably in form of flower and foliage, and though typically they are blue or blue-purple flowers, most, if not all the species, have white and red-purple forms. At this time, when the borders are quite bare of foliage, flowers whose colors harmonize agreeably with the soil are most effective. Yellow flowers are cheerful at any time, but, like the white ones, require a certain amount of green foil to be altogether satisfactory. Spring-flowering bulbous plants have sparse foliage; those that have white and yellow colorings in the flowers are better grown either in grass or under some low-growing herbaceous plants. But the purple

flowers harmonize perfectly with the bare earth, and whether there is a lone plant or a coloring of hundreds in the border there is a natural, harmonious effect very satisfying to any one sensitive to the quieter influences of the garden. *Scilla bifolia* and *S. Sibirica* are the earliest to flower, and of these species the Asia Minor or Taurian forms are in advance. The form of *S. Sibirica*, known now as *multiflora*, is nearly over before the usual type begins to expand. A very pretty white form of *S. Sibirica* seems to be earlier than the type, as it is now in flower. This is a graceful habited flower, but not quite equal in purity of color to *S. bifolia alba*, whose star-like, upturned flowers suggest *Chionodoxas*. There is also sometimes in the garden a pleasing white *Scilla* with small hyacinth-like flowers, received as *S. amoena*. But these white forms are only oddities; the effective ones are the purple-flowering kinds. Those already mentioned, with *S. puschkinoides*, make a beautiful trio. As the season advances we have a succession of *Scillas*, such as *S. nutans*, *S. patula*, *S. campanulata*, etc.

The *Chionodoxas* have not yet a place in all gardens, though they are invaluable in early spring in bare borders, where they will thrive and maintain themselves under hard conditions. We have now, thanks mostly to Mr. Whittall, a rather wide variety of these flowers. The best blue of these are *C. Sardensis* and the same species with a dark eye. *C. Tmolusi* may be considered a dark-colored form of *C. Lucillæ*, which species, while the commonest, is one of the most effective, with large star-like flowers whose petals are more or less deeply tipped with blue in various shades. There are also daintily colored forms of these—very light blue, rosy and white—which are exquisite, not growing in large colonies at present. The large-flowering forms, *C. grandiflora* and *C. Alleni*, are much alike, scarcely to be maintained separately in the garden. They may be considered a distinct kind with large, but not as plentiful, flowers as other species. These flowers are a slaty light blue, and *C. Alleni* has traces of a lighter centre. Grown under glass this centre becomes so pronounced that the flowers resemble those of *C. Lucillæ*. *C. Cretica* is another species, but its small flowers are not pure in color, and it is scarcely worth growing. *Chionodoxas* and *Scillas* are so closely related that hybrids, even natural ones, are not uncommon.

Elizabeth, N. J.

J. N. Gerard.

Correspondence.

Notes from West Virginia.

To the Editor of GARDEN AND FOREST:

Sir,—One must live in the country all the year round to find how interesting a garden can be made in March with the earliest flowering shrubs and plants. Here at Rose Brake we have done much to make the grove and waste places of the grounds attractive by using our native wild flowers and naturalizing such foreign plants as take kindly to our conditions. Bloodroot, Twin Leaf (*Jeffersonia*), Dutchman's Breeches and many other easily transplanted wild things have a singular charm, and parts of our Oak grove are thickly carpeted with these plants and Violets. Here and there among the rocks the sweet-scented English Violets have formed colonies which are the first to bloom, followed by *Viola cucullata*, *V. pedata*, *V. blanda*, and here and there a clump of *V. sagittata*, so that we have Violets from the middle of March to the end of May. The Twin Leaf increases rapidly and its large white blossoms are associated with the still more purely white Bloodroot, which precedes it by a few days. It can be easily transplanted in early spring, and if carefully removed without disturbing the roots it will flower as abundantly in one place as another. This is true of the *Dicentras*, *D. cucularia*, *D. Canadensis* (Squirrel Corn), and many other common flowers which only require a mass of earth removed with the roots when the ground is softened by some spring rains. Crocuses by the hundred are naturalized in the grass on the lawn, and although they do not increase rapidly they certainly do not diminish; they are improved, however, by rich soil and cultivation, as seen by the superior size and beauty of the groups planted in garden beds. We have tried all the species and varieties, except the costly rarities, so that we have the early sorts in bloom here by February, while the later ones make a good show until the middle of April. Of course, there are colonies of Snowdrops, Snowflakes, *Chionodoxas*, *Scillas*, Daffodils and Irises naturalized here and there in secluded spots under trees and in rocky soil in the grove, garden and orchard, where they charm us by their unexpectedness as we chance to come upon them in full bloom bending before the rough breezes of March. The evergreen plants have a cheerful look in the rock-garden, and we now have a few flow-

ers from the Hepaticas, Hellebores, Rock Foils, Saponarias and Thymes, while here and there the Saxifragas, Spring Adonis and *Eranthis hyemalis* are flowering, and, of course, the hardy Candytufts and Creeping Phloxes are a mass of flowers and verdure. Our common wild Saxifraga *Virginica* is often found blooming early in the spring about moss-covered rocks among Ferns and Rue Anemones, but there is a great number of species and varieties to be had from European plantmen. I now have a variety of *S. cordifolia* in bloom, which is labeled *Smithii*, with handsome foliage, dark green leaves, somewhat liable to decay under the winter protection of forest leaves, and clusters of bright pink flowers. Not to be despised is the common Periwinkle, *Vinca minor*, for the cheerful green of its new leaves and the bright blue of its flowers as they twinkle in the sun after a shower. The plant, however, is such an aggressive grower that it must be used with discrimination. It can be effectively employed on rough banks and in shady places where grass does not flourish, and here it will quickly kill out less sturdy plants and give a carpet of dark verdure all summer long when out of bloom.

Rose Brake, W. Va.

Danske Dandridge.

Nursery Notes from Flatbush, Long Island.

To the Editor of GARDEN AND FOREST:

Sir,—The quaint old Dutch town of Flatbush, until last year a suburb, but now a part of the city of Brooklyn, contains more than thirty nurseries. Some of these are in groups, and thus conveniently accessible, but only a few can be visited in a day, since they are scattered over the township, which, even in the less remote parts, is but sparsely built up in detached dwellings, with stretches of newly plowed fields and here and there a low, old-time farm-house. At the beginning of Flatbush, near Prospect Park, is the establishment of Charles Zeller's Sons, containing five acres in trees, shrubs, glass houses, frames and beds. For ten years this firm has experimented with Pansies, and they have a choice strain of the very largest sizes and most beautiful colors. Nine frames, five by thirty-five feet, made a showy effect last week, and they sell 10,000 of these plants during spring at an advance of \$1.00 to \$1.50 a hundred above the market price for ordinary sorts. Hyacinths are being brought on for Easter from bulbs of extra quality ordered direct from Holland. Most of these are still in frames, where they have wintered since October, and are gradually coming into flower. Many are in twelve-inch pans holding a dozen bulbs. In their selected list Gertrude and Charles Dickens were the best deep pink, and Gigantea a beautiful light pink. The best yellow was Ida; La Grandesse was the choice among white ones, with the old Baroness Van Thuill also superior. Czar Peter was the best light blue, and beds of King of the Blue and Leonidas were showy masses of an intensely deep shade of the same color. These are all single-flowering. All this stock is already sold, with only the responsibility to the grower of having it at the best flowering stage for Easter. Altogether, 4,000 square feet of glass are used here for hotbeds, and seven houses 100 feet long. Some large plants of *Acacia paradoxa*, eight years old, were coming into flower for Easter, valued at \$15.00 each, wholesale. Lilies were also being brought on, and a large stock of medium size and standard Azaleas, besides *Cytisus Canariensis* and small bushy plants of *Deutzia gracilis*. In a house of foliage plants young specimens of *Livistonia rotundifolia* looked well, as did *Phyllanthus roseopictus*, with variegated bright pink foliage; the latter is said to thrive well outside and is especially useful for summer planting. Tall plants of the New Zealand Flax *Phormium tenax*, the comparatively new *Dracæna Sanderanæ*, and *Begonia corallina*, probably the best of the older Begonias, and almost continuously in bloom, were also noted. Several old standard plants of the Niphetos Rose which bloom when other white roses are scarce, afforded flowers which have a demand for funeral work. But the specialty here is the Otahite Orange. One of the houses was filled with plants, now a mass of fragrant bloom, the busy hum of bees adding to the summery effect. On some plants the tiny oranges were just formed, and all will be brought into ripened fruit for Christmas. The plants were grown from cuttings made in February two years ago, and a few specimens left over from last year's stock still show large handsome fruit. Standards are grown a year longer than the specimen plants. During the two years of growth the fruit is cut off each season as soon as it is formed and the plants are trimmed into shape. They are planted out in summer in partial shade. The fruit persists for eighteen months under ordinary conditions with proper watering. The plants seen here were compact and shapely and in perfect health.

At Louis Schmutz's place on Clarkson Street were two houses of Hydrangeas, some of them far enough along to be kept cool now, with the advantage of hardening off and thus lasting longer in the purchaser's hands. Plants of Azaleas and *Deutzia gracilis* were also held in check. Among odd specimens collected during a long business course were old-fashioned plants of Myrtle, popular for making wreaths for German weddings; an old *Maréchal Niel* Rose, trained to a trellis and in luxuriant bloom; the flowers sell for \$3.00 a dozen, wholesale. One of the ten houses contained tall old Camellias, some of the larger ones crowded to the peak of the roof, fifteen feet above. Two of these venerable trees were covered with flowers and buds, and time's mockery was illustrated in the changed fortune of these once fashionable and costly flowers which now find sale only on the Bowery, for funerals. In this house was also a sturdy plant of *Daphne odora*, left over from the years when these plants were found in every Camellia-house, and a standard *Acacia pubescens*, twenty-five years old, which measured eighteen inches at the base of a trunk of almost that circumference for five feet, when it divided into branches under which one could stand, with room to spare. The flower-sprays of this tree-like standard had been cut recently, but the grace of its form and foliage still remained. There were showy plants of the tender *Streptosolon Jamesoni*, with drooping sprays of rich orange nasturtium-like flowers, *Swainsonia*, and sturdy well-grown English Primroses and Daisies in frames. Three hundred plants of Crimson Rambler Rose are being forced here for Easter and for Memorial Day. Two-year-old plants, wintered out-of-doors under glass, were brought into heat two months ago. They are in six-inch pots and trained to an arch two feet high. This Rose breaks earlier than any other, and the plants seen here last week carried large clusters of tiny buds with the pink just beginning to show. They are already engaged at \$18.00 a dozen, wholesale.

On the same thoroughfare Charles E. Koch has twenty-seven houses, besides 300 sash in frames. In a large variety of bedding plants were 30,000 Geraniums, half of which were the brilliant double General Grant. Even this large stock is but a small part of the Geraniums used in the cemeteries in this district. Eight houses of Carnations supply cut flowers, and 1,000 to 1,200 blooms of Lizzie McGowan alone were cut on some days last winter, and 2,400 spikes of Mignonette were part of the Easter stock last year, when this movable feast came earlier.

George E. Bennett, successor to William Bennett, among the pioneers in this business in Flatbush thirty-two years ago, has fifteen houses devoted entirely to Carnations and Mignonette. Besides the usual market varieties of Carnations, Mr. Bennett has a promising sport from Daybreak. About 1,800 Carnations are marketed daily now, and as many as 6,000 a day during the midwinter holidays.

In a line with the other establishments on Clarkson Street is that of Mrs. Meissner, and here fourteen houses were taken up with Easter stock and bedding plants, all of which had found ready buyers. Two thousand five hundred pots of Lilies, equally divided between *L. Harrisii* and *L. longiflorum*, thrifty small plants of *Hydrangea Otaksa* and of Azalea, were among the Easter stock. Small plants of *Pteris densa compacta*, grown from spores, made a stretch of beautiful bright green. Here, as elsewhere, plants of the Bermuda Lily contrasted unfavorably this season with those of *Lilium longiflorum*. The complaint is general that the Bermuda bulbs are each year less satisfactory; that they are not properly ripened, the tops being cut while yet green. Lack of proper cultivation of the bulbs is also alleged to account for their inferior quality. While many of the *Lilium Harrisii* from Bermuda show defective and worthless buds and spotted foliage, it is quite common for a bulb of *L. longiflorum* to have two and even three and four stalks, with abundant buds.

Of the five acres of the Messrs. Dailedouze Brothers, 45,000 square feet of ground is covered with glass. Carnations occupy three-fourths of the twenty-four houses, several being in use for the exceptionally large strain of Mignonette grown by this firm, and which has a place all its own in the New York trade. The end of the season is approaching, although there will be cuttings until the middle of June. Closely flowered spikes having a diameter of two to two and a half inches for six inches and more are typical of this strain. With no special preparations for Easter, these houses were none the less interesting, with large collections of all the best Carnations grown to perfection. The selling qualities of William Scott are shown in the fact that one-third of all the Carnations grown are of this variety; Lizzie McGowan ranks next in popularity, with Daybreak third. These bring an equal price, while smaller quantities of the variegated Helen Keller and Minnie Cook, the

light yellow Eldorado and the scarlet Hector bring one-third more. Of the regular sorts as grown here Meteor is found to be too single, and the blooming season of three months in midwinter is too short. A good crimson seedling is needed to supersede it. John Burton's new white Carnation is here, a perfectly clear white, the petals cup-shaped and shorter than those of Lizzie McGowan, flowers of medium size, with a good stem. They are almost camellia-like in their whiteness and regularity of form. Alaska has also done well here. Helen Keller is particularly successful here, owing to the soil, Mr. Dailedouze thinks, and perhaps nine-tenths of the carnations sold in New York come from these houses. Minnie Cook they find apt to burst in the calyx. Eldorado flowers fairly well, though not freely, and is a good keeper. The clear light yellow petals, which are deeply serrated and delicately touched on the edges with rosy pink, suggest the flowers of Andalusia, a variety introduced from France seven or eight years ago and discarded in a few years as not free-blooming. The even distribution of the petals of this very full Carnation helps to make a pleasing flower, and its color is charming. Bouton d'Or has proved satisfactory here, but Buttercup is too shy during winter, though it is said to be entirely satisfactory in this respect in some parts of Connecticut. Eldorado is said to do well out-of-doors, and also to flower well under glass in summer, as do William Scott and Lizzie McGowan, while Daybreak is not so good in summer, Minnie Cook only fair, and Helen Keller does not flower at all. Among new carnations being tested are a silver-pink seedling not yet named, and known as No. 3. The light outer petals shade deeper to the centre and the flower has a spicy fragrance. The calyx, stem and other characteristics are altogether superior, and its uniform good qualities won a certificate of 100 points from the American Institute recently. A new deep rich crimson under trial promises to make good the weak points of Meteor in flowering early and late in the season. Cuttings made at Christmas for next season's flowers will be planted out from the middle of April to the first of May, and brought in late in August. Flowers are cut from September until July, 1,000 to 2,000 a day now, and for Christmas and New Year's, when they can be held on the plants for a week or two, from 8,000 to 10,000 every twenty-four hours. They are allowed to develop freely before cutting, but not to be overgrown, and are kept cool twelve to eighteen hours before delivering to buyers. The propagation of Chrysanthemums for cut flowers is just begun.

The adjoining houses belong to Joseph Gard, who, fresh from a wide experience in Switzerland and France, in 1862 established a nursery of twenty-five acres of trees and shrubs on this site in partnership with the elder Dailedouze and Zeller. After the dissolution of the firm and division of the ground, Mr. Gard adapted his business to trade demands, and for many years grew Marie Louise Violets with marked success. His output some years ago averaged 16,000 a week, and \$3.00 a hundred was the uniform price paid him for all his stock throughout one season. Later, \$2.50 was obtained from November until New Year's, when the price fell to \$1.25, and in March to sixty cents. Within the past four years Violets have done indifferently here, and Mr. Gard notes a similar want of success with Roses in Flatbush, owing, he thinks, to changed atmospheric conditions. He states that he used to gather Tea Roses by the bushel out-of-doors in summer, and now these plants do not flourish at all. Bedding plants are the main crop here, and Verbenas a specialty, 25,000 of these plants being sold during spring.

Returning to the heart of the town by way of Lenox Road, Mr. G. Messeberg's place may be visited, established twenty-nine years ago by the father of the present owner. Thirteen well-kept houses, besides many frames, were filled with Easter and bedding plants. The Longiflorum Lilies grown here this year are from Japanese bulbs, and the experience of Mr. Messeberg shows that these produce more and better flowers than the same sized bulbs of *L. longiflorum* from Bermuda, and he thinks it is only a question of time when Bermuda bulbs will be discarded. He considers *L. longiflorum* superior to *L. Harrisii* for a late Easter, as the flowers have more substance and keep longer, and are, besides, more graceful, while a few hot days wilt *Lilium Harrisii*. Bulbs of the latter from Bermuda cost Mr. Messeberg \$20.00 a thousand, and those of *L. longiflorum*, from Japan, \$38.00. But these more costly ones can be depended upon for a full and healthy crop, and the flowers sell for two cents apiece more at wholesale. Hydrangeas, Cinerarias and the best standard sorts of Azaleas filled several houses. The best red Azalea was Madame Van der Cruyssen, the richly colored flowers having fluted edges; the double *Vervaneana* and the single *Comte de Chambord* were the best pink; Bernard André alba and Raphael were among

choice white kinds, with Baroness de Weir best of all. Self colors of pink and white are most in favor. An entire house is filled with the best varieties of English Pelargoniums, and the new Souvenir du President Carnot Rose is grown in large numbers. The crop of 35,000 Pansies is already sold.

In the houses of C. Wocker, just beyond, were forced plants of *Deutzia gracilis* and superbly flowered Hydrangeas, many of the heads more than a foot across. There were plants of the showy *Metrosideros* and the uncommon and beautiful *Choisya ternata*, with orange-like flowers, and the deep green foliage almost equally fragrant.

New York.

M. B. C.

Notes.

The Civil Service Commission of New York city will hold an examination for the position of gardener and gardener's apprentice, at its office on the corner of Centre and Franklin Streets, at ten o'clock in the morning of April 22d. Applications may be addressed to S. William Briscoe, Secretary, New Criminal Court Building, New York city. Candidates must be citizens of the United States, and candidates for the position of gardener's apprentice must be between the ages of eighteen and twenty-one years.

We learn from a correspondent in Copenhagen that the ladies of that city last month collected an interesting exhibition of Orchids in flower as well as paintings and engravings of the native Orchids of Denmark, and of exotic species, besides pottery decorated with Orchid designs. The exhibition was most successful and attracted large numbers of visitors, including the entire royal family. The aim of the undertaking was to raise money to help the construction of a building in Copenhagen for the exhibition of work exclusively by women.

Professor D. T. MacDougal writes to *Science* that the project for establishing a botanical laboratory in the American tropics has made such progress that a commission has been organized for the selection of a site for the proposed laboratory and for ascertaining how far the coöperation of American and British botanists can be enlisted in the scheme. The commission will select a location conveniently placed with reference to towns or settlements and in easy connection with a marine substation, and yet near the presence of a body of undisturbed tropical vegetation. The American members of the commission are Professor Douglas Campbell, of Stanford University; Professor J. M. Coulter, University of Chicago; Professor W. G. Farlow, Harvard University; Professor D. T. MacDougal, University of Minnesota. The committee will be ready to make an informal report to the American Association at Detroit, and the British Association at Toronto, at their meetings in August.

In Bulletin No. 9, which discusses the rate of increase in the cut-over timber lands of Minnesota, we find, among miscellaneous notes, that the oldest White Pine noticed by Mr. H. B. Ayres had 348 rings on the stump and a diameter of thirty inches. The top of this tree was broken off at 114 feet above the stump and sixty-eight lineal feet of log timber were taken from it which scaled 1,400 feet, board measure. A larger tree than this, although one not as old, was forty-eight inches in diameter on the stump and contained 4,050 feet, board measure, of log timber. This tree with several large ones near by which grew on fertile soil averaged about 253 years old when cut. When fifty years old they average only eight inches in diameter, but at 150 years of age they were adding about half an inch to their trunk diameter every year. The largest Norway Pine noticed was 330 years old with a stump diameter of thirty-two inches and a height of 103 feet. Seventy-two lineal feet of log timber taken from it scaled 1,830 feet, board measure.

Ordinary Barn-yard Grass, *Panicum Crus-galli*, is a coarse annual, occurring in damp places or cultivated ground, and often becomes a troublesome weed. Among three kinds of Millet recently received by the Massachusetts Experiment Station is a variety of this Barn-yard Grass which seems to be botanically identical with our plant, although it differs from it somewhat in its habit of growth. Professor Brooks, of the Massachusetts Station, recommends it enthusiastically as a fodder crop for feeding green or for the silo, and says that it may yield ten or twelve tons of fodder to the acre, or if thinly sown in rows a foot apart it will produce from fifty to ninety bushels of seed. In a newspaper slip lately issued by the Maine Experiment Station it is said that while this may be a valuable acquisition, farmers ought to be cautioned about procuring the seed which is sold as Japanese Millet. Certainly the

seed of our *P. Crus-galli* should only be purchased of dealers who will be sure to furnish the seed of the Japanese variety, since the mischief which would be wrought by sowing the seed of the ordinary Barn-yard Grass is self-evident.

Mr. F. W. Burbidge read an interesting paper at Manchester last month on the "Culture of Hardy Bulbs in England." He stated that England paid half a million dollars every year to Dutch bulb growers in spite of the fact that it had been proved that the home supply of Narcissi, Crocuses, Tulips and others could be easily grown in favored parts of England, and with special care in the market-gardens about London and the Isle of Wight, where they would be the most profitable of crops. Even in Holland and other places where bulbs have long been specially cultivated success is only assured on plots with a suitable soil, and that such soils can be found at home is proved by the fact that hundreds of acres are already in cultivation both in Great Britain and Ireland. The thing to be remembered is that the soil which grows the best Hyacinths is not the best for Narcissi nor for Tulips; and, again, land however good will not grow bulbs year after year without enrichment or recuperative crop rotation. In fact, Mr. Burbidge said that it was not soil or climate in Holland which made that country preëminent for good bulbs, but it was the methodical thrift and skillful industry of the people.

The discovery that the pith of the corn stalk can be used in the construction of war vessels is likely to be of benefit to agriculture in more than one way. The chief use of this pith is for a packing between the inner and outer shells of the vessel so that when pierced by a projectile it will absorb water and swell so rapidly as to close the opening before the vessel leaks to a dangerous extent. Experiments with this pith have been so satisfactory that it has been adopted in the construction of all our new vessels of war, and European nations have commissions for investigating the same material, so that the use of corn pith will make a market for what was once a waste product. In the process of extracting this pith the blades and husks are removed and the stalks are cut into small pieces. When the pith is taken out from this stalk the remainder is ground up into a flour-like substance which resembles bran. Some experiments with this "new corn product," as it is called, have been made at the Maryland Station with the remarkable result that it is found to contain eleven per cent. more of digestible matter and two per cent. more of digestible protein than the whole fodder does when shredded. It contains as much digestible matter as the corn blades and more total digestible matter and half of one per cent. more protein than Timothy hay. It does not contain as much digestible albuminoids as wheat bran, but it equals that food in the total amount of digestible matter. It keeps as well as bran or cottonseed meal. It is in such condition that it can be uniformly mixed with any ground grain, and when used as a base it is possible to make a complete and normal ration for stock in one bulk without the necessity of feeding grain and hay separately. Animals fed upon such a ration eat it with relish, and keep in normal condition. Since there is only one pound of pith to fourteen pounds of blades, husk and stalk, this new material amounts to a very considerable portion of the fodder.

Dr. Robert Hogg, the eminent pomologist and writer on various horticultural subjects, died on the 14th of March, in London, at the age of seventy-nine years. Dr. Hogg was a graduate of the University of Edinburgh. Being devoted to the study of natural science, and especially of botany, he acquired the knowledge of practical horticulture, and soon developed a taste for pomology, which enabled him later on to prepare the valuable *Fruit Manual*, a standard descriptive work. He began the publication of a larger work on British pomology, but only one volume, which treated on the Apple, was published. Dr. Hogg was a voluminous writer on various horticultural subjects, was for many years the editor of the *Journal of Horticulture*, a conspicuous member of the Pomological Society and Secretary of the Fruit Committee of the Royal Horticultural Society.

Philip Wickens, who for forty years was connected with the nursery firm of Ellwanger & Barry, died at Rochester on the 29th of March, in the sixty-ninth year of his age. He was born at Rotherfield, Sussex, England, and came to this country in 1851, where he soon became an authority on hardy fruits. He was an expert in many other branches of horticulture, a born gardener and an enthusiastic and discriminating lover of natural beauty. He was a retiring man, devoted to his special work, but of a genial sunny temper, which helped to brighten the lives of his associates.

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The National Forest Reservations.

CERTAIN western Senators are strenuously demanding the revocation of Mr. Cleveland's proclamation on the 22d of February, which established the great forest reserves on the Government lands. It is not likely that they will fully succeed, but some amendments to the Civil Sundries Bill are now before the Senate as a sort of compromise. The excuse is offered for attempting to legislate in such an unusual way that the wants of miners and settlers are immediate—that they need firewood and fencing and the right to build roads to their mines. This is true, but no one is suffering, and the fact is that the property of no one except the Government is threatened. Beyond question, some way of adjusting the rights of individuals and of the Government must be devised, but it is notorious that every effort to protect the public domain in these transactions by the agents hitherto appointed by the Secretary of the Interior has failed. Our defective land laws, inadequately and insufficiently enforced, have produced the inevitable result of making the inhabitants of the public-land states and territories look on the public domain as their own personal property. Few men in the west consider that they do wrong in cutting timber or pasturing their domestic animals on public land, and any attempt to check them is considered an infringement of their vested rights. At present there is but one way in which the reservations can be protected from fire and theft, and that is by military control. Of course, the troops should not be used permanently, and what is needed is the authority from Congress for the Secretary to organize a quasi military service of permanent trained forest officers to protect the reservations and carry out such rules and regulations as he may make for their administration.

A year ago the Secretary of the Interior, appreciating the gravity of the situation, and desiring more information than he possessed on the general forest situation in the west, asked the National Academy of Sciences for advice in the matter. A committee of experts was appointed by the Academy to consider the whole question, and during the past year it has devoted itself assiduously to this work. The report and recommendations will be in the hands of the Government in a few days,

and it seems at least unwise to legislate on such an important question before the information collected by the highest scientific body in the United States and the scientific adviser of the Government can be utilized. The legislation proposed by this committee, together with the report accompanying it, will be before Congress early next month, and in order to inform the Secretary of the Interior of its leading features the committee addressed to him on the 5th of April a letter, which we publish entire as a matter of record, and to show how carefully the rights and privileges of actual settlers have been considered:

To the Honorable

The Secretary of the Interior, Washington, D. C.

Sir,—The legislation relating to reserved forest lands of the public domain which the Commission of the National Academy will recommend in its final report, now in course of preparation, provides for the following:

First, that authority be given to the Secretary of War to make details of troops, at the request of the Secretary of the Interior, to protect temporarily, and until a forest service is organized, the property of the Government in the forest reservations from fire and trespass, and to enforce such rules and regulations as he may make for their care.

Second, the establishment of a permanent Forest Bureau in the Department of the Interior, composed of trained officers, to administer, maintain and improve the reserved forest lands.

Third, the appointment of a Commission to institute as rapidly as possible, under the supervision of the director of the Geological Survey, topographical surveys of the reservations and determine what portions of them should be permanently reserved on account of their forest covering and what portions should be reopened to entry and sale.

Fourth, to authorize the Secretary of the Interior to issue the necessary rules and regulations for the protection, growth and improvement of the forests on the reservations, for the sale of timber, firewood and fencing from them to actual settlers in and adjacent to the reservations and to owners of mines legally located therein for use in such mines; for granting permits to sawmill owners to enter the reservations for the purpose of manufacturing such lumber as may be sold to actual settlers in and adjacent to the reservations and to the owners of mines located therein; for allowing actual settlers who have no timber on their own claims to take from the reservations firewood, posts, poles and fencing material necessary for their immediate personal use; for allowing the public to enter and cross the reservations; for granting to county commissioners rights of way for wagon roads in and across the reservations; for granting rights of way for irrigating ditches, flumes and pipes, and for reservoir sites; and for permitting prospectors under such rules and regulations as he may from time to time establish to enter the reservations in search of valuable minerals.

The Commission will recommend that the reservations be opened to the location of mining claims under the general mineral laws, and that the owners of valid mining locations in the reservations made and held in good faith shall be permitted to fell and remove from their claims the timber growing on them for actual mining purposes in connection with the particular claim from which the timber is cut. It will also recommend that the owners of unperfected bona fide claims or patents of land included in the forest reservations shall be permitted to relinquish their claims to the Government, selecting in lieu tracts of vacant land open to settlement, but not exceeding in area the tracts covered by their claims or patents; and that the owners of such unperfected claims shall not be subjected to additional charges for entries or record, and that credit shall be allowed them for the time spent on the relinquished claims. The Commission will also recommend that the Secretary of the Interior be authorized to enter into negotiations with the land-grant railroad companies for the purpose of concluding agreements by which these companies may relinquish

to the United States the title acquired by them to lands within their granted and indemnity limits when these lands lie within the boundaries of forest reservations, and may accept other unappropriated lands in exchange from the even-numbered sections within their granted and indemnity limits not included in forest reservations.

Very respectfully,
your obedient servants,
(Signed) C. S. SARGENT,
HENRY L. ABBOT,
W. H. BREWER,
ARNOLD HAGUE,
GIFFORD PINCHOT.

The Red Cedar.

THE Red Cedar is a familiar tree to almost every American, since it ranges from Cape Cod to Vancouver's Island and from Canada to Florida. At the north it is found on uplands, cold, dry and hungry, while in Florida it inhabits swamps which are covered with water for a considerable portion of the year. In the deep bottomlands of Arkansas and Texas it is a noble tree, sometimes a hundred feet high, with an irregular trunk buttressed at the base and often four or five feet through. In the fertile valleys of the middle Atlantic states, when it has opportunity for full development, it is a broad-topped and dignified tree, while on the low limestone hills of northern Alabama and the neighboring states it is small and bushy, and on dry ridges, both in the west and in the east, it is little more than a shrub, and often fairly prostrate. The habit of the tree varies as much as its size, and one who is accustomed to see its pyramidal form with sharp spire-like top would hardly recognize it on the seacoast with its short, stout trunk and stiff horizontal branches which have developed under the stress of Atlantic gales. This wide variety means that it adapts itself to all sorts of surroundings and that it can live almost anywhere throughout an immense geographical range.

It need hardly be stated that the Red Cedar is really not in any botanical sense a Cedar, but a Juniper (*Juniperus Virginiana*), one of ten species found in the United States. Besides these there are from twenty to twenty-five other Junipers in the northern hemisphere, scattered from the arctic circle to the highlands of Mexico and the West Indies in the New World, and to Africa and southern Japan in the Old World. Of the American species the Ground Cedar, or common Juniper, crosses the continent from Greenland to Alaska and extends through northern and central Asia and Europe, so that it is altogether the mostly widely distributed tree in the northern hemisphere. Many garden forms of this species are known in cultivation, some dwarf, some with colored foliage, some of compact habit, some columnar, and others with pendulous branches. Among these a fastigiate form, called in nurseries the Swedish Juniper, is the best known in the gardens of this country. Another Juniper is confined to Texas and portions of Mexico, and there are half a dozen more which belong to the Pacific side of the continent and the forests of the Rocky Mountains. The Red Cedar is the largest and most useful of all the American Junipers. In some of the swamps of western Florida and in certain other places in the south its wood is formed with a singularly straight grain, which is soft and easily worked, and so completely adapted to the requirements of lead pencils that it is almost exclusively used in their manufacture. Its fragrant odor is repellent to moths, so that cedar-lined chests and closets are in universal use for storing woollens. It is so durable in connection with the ground that it is the best tree we have for fence-posts or the sills of buildings, and its rich color, its durability and its pleasant fragrance make it useful in many kinds of cabinet-work. But while its economical value has been always understood, its use in horticulture has been comparatively limited. Large quantities of these trees were raised some years ago for hedge-plants in the west,

but they did not prove acceptable for this purpose. This was not only because the Red Cedar grows slowly, but the branches of the tree have a habit of dying when they come in contact with those of another tree, so that it is not as good for this purpose as the *Arbor Vitæ*. It endures shearing quite as well as any other tree, however, and since there seems to be a tendency now to try the fashion of formal gardens in the northern states, there is no tree so well adapted to take the place filled by the Cypress in the gardens and southern Europe. But, even if it is not mutilated in this way, the tree in any of its forms fits naturally into an American landscape. When grown in rich soil, with an opportunity to expand, in a sheltered place it will make a dignified and stately specimen, and where a cylindrical or spire-topped tree is needed nothing better than the Red Cedar can be found.

The natural form of these trees on a cold New England slope is seen in the picture on page 145, which represents them as every one knows them in a winter landscape at the north. Here is the perfection of careless grouping and a grace of individual form which the dullest eye can at once perceive. Why a more extended use has not been made of the Red Cedar in park planting is difficult to understand, since it would be invaluable in certain positions. It is objected to the tree in winter that the foliage turns to a dull brown, but really the bronze color is in perfect accord with the tone of the whole landscape. The cheerful green of certain conifers is effective, too, under certain conditions, but in very cold weather the leaves of most species turn dark, and, indeed, any light green seems out of place in a season when there is no growth in vegetation. We associate the green with active life; it is the color of spring and summer, and we naturally expect that trees with persistent leaves will show in some way that they are in a state of suspended animation. There has been so little demand for Red Cedars that nurserymen do not keep them in large quantities, although they are very easy to raise from seed. There is little difficulty, however, in transplanting young trees from old pastures, where they spring up from the seeds dropped by birds. These long lines of Red Cedars along fence rows are conspicuous features in the landscape of the older settled parts of the country, and their effectiveness in such situations and upon the slopes of rocky hills and on the summits of knolls ought to convince every one of their usefulness in planting parks and private grounds large and small.

Mature White Pine in Pennsylvania.

TRACTS of uncut White Pine in Pennsylvania are few in number and of restricted area. It is doubtful if there are in the state to-day half a dozen tracts of 2,000 acres in extent in which the White Pine occurs in sufficient quantity to give character to the forest. One of the best of the large tracts is the property of Mr. John Du Bois, and is located near the town of that name in the north-western part of Clearfield County. There remain here about 1,500 acres of uncut Pine, but the merchantable timber of all sorts is being systematically harvested. The Pine, as is the case in all the mature timber of the state, occurs as scattered individual trees in a mixed growth of Hemlocks and hardwoods. In some places Hemlocks are entirely absent, while again they are the prevailing trees. So, too, within the space of half a mile one may find a heavy stand of Pines and an area where few of the trees occur.

The yields of two acres were measured in the Du Bois tract and illustrate this varying stand of Pine. The two sample acres were less than a mile apart, and in general the character of soil and moisture supply were similar—a clay loam overlying laminated shale, well-watered by little brooks which led into Narrow Creek. In both areas the Pines were the tallest trees, with a second story of Hemlocks having a slight admixture of hardwoods.

In one acre there were 37 White Pines, ranging in diameter, at breast-high, from fifteen to forty-five inches; 84

Hemlocks, more than six inches in diameter, and 179 smaller Hemlocks; 11 Beech and Red Maple more than six inches in diameter, with 221 smaller hardwood trees. In addition to the small Beech, Maple and Birch trees, there were Dogwoods, Cucumber-trees, a few masses of Laurel, etc., making a moderately dense undergrowth. The other acre had a much more open and irregular stand, with scanty undergrowth of hardwoods and shrubs. It contained 23 White Pines of the same size as those in the first acre, 37 Hemlocks, and 74 hardwoods (Beech, Maples and Birches) over three inches in diameter. The first of these two sample areas contained Pine of the finest quality and size. It was found to range in age from 230 to 260 years. Seventeen of the largest Pines were carefully measured after being cut into logs, and contained above 40,000 feet, board measure, the largest tree measuring more than 4,300 feet, board measure. The average length of trunk to base of crown in thirty trees was 91 feet, the longest trunk free of limbs being 112 feet, while the tallest tree on the acre was 158 feet high. The total contents of thirty of the trees on this acre was found, by Scribner's rule, to be above 60,000 feet, board measure.

Many single acres could be found equal to the one here cited, though it is much above the average yield of the entire tract. The White Pine in this particular locality is tall and straight, with comparatively short crown. In much the greater part of the tract the Hemlock is the prevailing tree, and in the limited areas where the hardwoods predominate the White Pine is of less frequent occurrence, with greater crown development, thus giving a relatively smaller yield of the best timber.

Washington, D. C.

Charles A. Keffer.

Burdock as a Vegetable.

THE well-known definition of a weed by Emerson as "a plant whose virtues have not yet been discovered," is confirmed by the better agricultural authority of Schwert, according to whom "a weed is a plant of which the direct uses are unknown to man." Both the poet-philosopher and the scientific farmer implicitly admit, I think, that as man brings more and more of nature under his control—in other words, as he brings more and more plants under cultivation, many of them, hitherto scorned as weeds, must cease to be considered as such. I have often seen ridiculed the Chinese custom of eating birds' nests, bears' claws and other incomprehensible delicacies, but I cannot help admiring the power of pantophagy on the one hand and the refinement of culinary skill on the other, which can convert into means of human enjoyment things apparently worthless and revolting. If, as philosophers say, civilization consists mainly in bringing natural forces under man's subjection, China must be given a high place in the scale of civilization from a culinary point of view.

Is it not a real triumph of art to extract food for man from so coarse and ugly a weed as Burdock? Most books on botany in the English tongue describe Burdock, Lappa major or officinalis, as a pestiferous weed, and many an agricultural bulletin gives careful instruction how to destroy it. Perhaps the only use that has been made of Lappa in America is for medicine. The root contains a bitter principle, a resin and tannin, and it is said to have an aperient and diuretic effect. It also has some reputation as an alterative in constitutional blood diseases, and the readers of GARDEN AND FOREST may have used the so-called "Burdock tea." In Germany, where the three species, *L. major*, *L. minor*, *L. tomentosa*, are widely spread, they were formerly much used as medicines under the name *Radix Bardanæ*; and they are even now regarded by some as good blood purifiers. Perhaps from the burr of the seeds the plant has the repute of power to stimulate a rich growth of hair, and an extract for this purpose is made from the roots. The peasants of the south of England use the roots as an antiscorbutic, and the leaves are employed in making a green elder ointment for the use of farriers.

All these medicinal uses are not to be despised, but they are unimportant when compared to the value of the plant as an edible vegetable; since the kitchen is more important than the drug store, the cook is nearer our hearts than the apothecary. Even in England the alimentary value of Burdock was not always despised. Sowerby writes in his *Useful Plants of Great Britain*, "The stalks of the Burdock, cut before the flowers open and stripped of their rind, form a delicate vegetable when boiled, similar in flavor to asparagus. In the raw state they may be eaten with oil and vinegar as salad. They were sometimes candied with sugar in the time of Bryant, as those of Angelica are. They are slightly laxative, but are perfectly wholesome. The roots of the plant are mildly diuretic and diaphoretic, and have been used with advantage in gout, rheumatism and calculous complaints. The decoction of the root is generally employed, but the seeds and leaves possess nearly the same properties, though the latter are slightly purgative. The bruised leaves are applied by the peasantry in some districts, in cataplasms to the feet, as a remedy for hysterical disorders."

In Japan, Burdock grows wild in several places, but it is also extensively cultivated as a vegetable. Every one knows and eats "Gobo," the usual appellation for this plant, although a more refined and almost obsolete name is "Kitakisu"; sometimes it is called "Uma (horse)-fuki (Nardosmia)." It is familiar to the Ainu under the name of "Seta (dog)-korokoni (Nardosmia)." Both the Ainu and the Japanese prefixes, "seta" and "uma," when applied to plants, seem to have much the same sense as the English "dog," in dogwood, dogbane, etc., and the "horse" in horse-radish, horse-chestnut, horse-mint, etc. The Ainu use it as food as well as medicine. They boil the tender shoots with beans, and the roots are put into soup. For medicinal uses the young leaves are softened by rolling them between the palms, and applied to skin eruptions. The Japanese esteem Lappa for similar purposes. It is used in many preparations for its medicinal properties, which, they believe—at least, the old-fashioned empirics believe—consist in counteracting the action of some kinds of poisons. Grated and made into pulp, the roots are applied as a poultice in eruptions of the skin. But by far the more important use is made in the kitchen. As regards this plant we have outstripped the pantophagous Chinese, for they have not raised the plant to the dignity of a market vegetable. "When young," says a Chinese book on botany, "the tender leaves of the Lappa are cut and eaten as greens; the roots may be boiled or steamed and eaten, but people nowadays rarely use the plant." Among the Japanese, however, it has been under cultivation for years, and possibly for centuries. It enters the kitchen of every household, not being ostracized from the menu of the most high-toned restaurant. Thousands of acres are devoted to its culture. Official statistics for 1888 give the total production of Lappa in the country at about seventy-two million pounds, valued at 422,134 yen. The roots average 350 grains in weight.

The production of so large a quantity is not at all to be wondered at when we recollect that Lappa ranks high in the scale of nutritive plants. In the amount of nitrogen it stands higher than potatoes, beets, carrots or turnips; in fact, few roots or tubers approach it. I append here its chemical composition, as compared with some other commonly used vegetables:

	H ₂ O	N.	Ash.	K ₂ O	Na ₂ O	CaO	MgO	P ₂ O ₅	SO ₃	SiO ₂	Cl.
Potatoes.....	750	3.4	9.5	5.8	0.3	0.3	0.5	1.6	0.6	0.2	0.3
Sugar beets.....	815	1.6	7.1	3.8	0.6	0.4	0.6	0.9	0.3	0.2	0.3
Turnips.....	920	1.8	6.4	2.9	0.6	0.7	0.2	0.8	0.7	0.1	0.3
Carrots.....	850	2.2	8.2	3.0	1.7	0.9	0.4	1.1	0.5	0.2	0.4
Burdock.....	738	5.6	10.5	4.3	0.2	1.1	2.0	0.9	0.7	0.1	...

So important a crop as Burdock has, of course, many varieties developed, but the best known among them are few in number. They are usually named from the localities where they were first developed or where they thrive

best. A variety known as the Takinozawa, raised chiefly near Tōkyō, has a slender root, about four feet long, and is of very fine quality. In the vegetable market of Tōkyō it commands a respectable price. The Owura variety, so named from a small place in the province of Shimosa, where they produce only about two thousand roots a year, attains the huge size of one and a half feet in circumference and two and a half feet in length; this kind is sold at the rate of about twenty sen (a sen being a hundredth part of a Japanese dollar) apiece. In its form this variety is like the beet. The two kinds most popular in the markets of Kyoto are the Yamato and the Horikawa; in fact, these seem to be only different names of the same variety.

In raising Lappa much attention is naturally devoted to the right selection of the soil. It is a common belief among cultivators that a light sandy soil is specially adapted to it, and it is true that roots grown from such soil are long and slender, but they are prone to be hollow at the centre and rather tough at the rind. A stronger and deeper soil, say clayey loam, seems to impart firmness to the root and a better flavor. To gain the most satisfactory results, the soil must be plowed deep and finely pulverized, or else an undue amount of labor will be required in harvesting the roots. Indeed, digging Burdock is a proverbially hard task; it has become almost a fine art to do it well. Many an old writer recommends digging the soil to the depth of some four or five feet, and then putting in green leaves, stalks, turf, and so forth, in a layer of a foot deep, and covering that with the earth that was excavated. The surface must then be well hoed in both directions. So much care, however, is only necessary when exceptionally fine specimens, for show or otherwise, are aimed at. One peculiarity of Lappa is that it is not adapted to rotation—that is, it thrives better if planted continuously on the same soil; in new land the roots are likely to become forked. It is also grateful for good manures—compost, night-soil, and especially to rice-bran—but if compost is applied it must be well decomposed, or else the roots will throw off too many branches.

When the soil is properly prepared seeds are planted in rows three feet apart, five or six seeds being placed every six to eight inches in a row. In Owura, the usual time for sowing is the early part of May or late in April. Before the early part of June the young plants are thinned out, leaving but one in the hill. Very often liquid manure is applied two or three times before the roots are harvested late in December. Another method is to plant the seeds in August, so as to have the vegetable ready for spring use, in which case they are sown more closely, since they do not grow as vigorously as those planted in spring. Lappa is a slow grower and takes over two hundred and twenty days to mature. Seeds retain their vitality for five years, and many a gardener asserts that the best crop is obtained from those three years old. They say that new seeds produce roots which throw off too many branches and flower-stalks. This statement, however, is not always verified. For keeping and marketing, the vegetable may simply be left where it was grown or kept buried in the earth like beets or turnips.

I am aware that a discourse on Burdock will be of little interest to Americans unless it contains some information regarding the mode of using it, but it must be remembered that Japanese cuisine differs widely from the American. I need only state in general terms that, after their skin is scraped or peeled off, the roots may be sliced into long strips or cut into pieces of less than an inch in length, and boiled with soy, salt or Spanish pepper, to impart savor to them; or, if boiled alone, they may afterward be browned in sesame oil, which of itself will flavor them. Another common way of cooking them is to scrape off the outer skin and cut them into pieces about two inches long, then, when they are boiled soft, to take them out of the pan and mash them; then make them into cakes, much as you treat oyster-plants. A kind of salad, though not uncooked, is also made of them. A rather unique and more elegant

process consists in stuffing the roots with sea-eel, and boiling them, after dipping them in a preparation containing soy and pepper. Slices of lappa fried and eaten with some condiments form one of the commonest dishes with us. The roots are sometimes pickled in miso. There are many other ways of preparing this valuable vegetable for table use, but a longer description would be interesting or amusing only to the curious. Each country has its own victua to inspire it with oracles in the mysteries of national taste and national cookery. American housewives will naturally turn to a Mrs. Lincoln or a Mrs. Rorer for inspiration on this score, and I may forbear further gastronomic dissertation concerning our plant.

Sapporo, Japan.

Inazo Nitobe.

Plant Notes.

Lilium pardalinum.

THIS is another of the Turk's Cap Lilies, and is nearly related to *Lilium superbum* of the Atlantic coast of North America. *Lilium pardalinum* is found throughout the Coast Range, the Sierras and the Cascades, from Mono County, in eastern California, and San Luis Obispo County on the coast side, to the British Columbian coast, and northeast to Lake Winnipeg. I lack information as to whether it extends farther in southern California, or exists in the high ranges of Nevada and Arizona. As it extends east of the Rocky Mountains to Lake Winnipeg it must exist in at least the northern Rocky Mountains. I should appreciate any information with regard to its distribution in these regions.

Lilium pardalinum is usually called a bog Lily, though not altogether correctly. As a matter of fact, while it is found frequently in bogs or wet places, it more often makes its home in open moist meadows, in a sandy soil rich in alluvium, or in deep alluvial deposits along the banks of mountain streams. The bulb, as it is convenient to call it, although it is properly a rhizome, is a curious and interesting study. It may be described as a thick fleshy root-stock, covered closely with one, two or three jointed, closely overlapping scales, which break off easily. Generally, the young rhizome terminates in two or three buds, each of which produces a stalk the succeeding year. As each of these growing buds will in like manner produce from one to three growing bulbs (for lack of a better name) the following year, it is evident that in a term of years very large clumps will be formed. Again, as each growing bulb is produced at an angle to the axis of the growth of the preceding year, branches of the intricate, ramifying rhizome are soon turned around and cross the earlier growth. In this way incredibly large clumps are formed. The rhizome branches two or three deep; the interior ones are compressed and starved, the exterior growing bulbs strong and vigorous, and the entire mass easily traceable to the original parent. The older rhizome becomes yellow, the new growing bulbs are white, and by the scars left on the rhizomes by the succeeding stalks many years' growth can be traced. I have frequently seen masses of from fifty to two hundred growing bulbs, while I once found over five hundred in a single clump on a hillock in a bog. The vitality of the rhizome is great, and pieces cut from the old rhizome will form bulbs. Where a rich, loose soil permits the fullest development, a clump of *L. pardalinum* bulbs is really beautiful. The size, shape and the jointing of the scales vary greatly in different kinds, and although not strictly reliable in their characteristics are an aid in determining the species. Some forms of *L. pardalinum* usually produce but one terminal growing bulb, and in such forms no clumps are produced and the rhizome is long and zigzag.

This Lily grows readily from seeds or scales, and is but little subject to disease. In earlier days it grew in wonderful profusion in some of our mountain meadows, and there are still numerous out-of-the-way places where it treats the hunter or mountain climber to gorgeous displays of color.

Mr. Luther Burbank, the well-known hybridizer, many years ago secured some bulbs of *Lilium pardalinum* near

the geysers in Sonoma County, California. From seedlings of these, selections were made, which on arriving at maturity were cross-fertilized, and this process was repeated several times. I saw a field of the last crosses, and parallels could be seen of nearly every native form of *L. pardalinum*, with giant and dwarf, one-flowered and many-flowered forms which nature had never attempted. Mr. Burbank firmly believes that not only all of our varieties of *L. pardalinum*, but all other Pacific coast Lilies, have a common parentage and have diversified in obedience to environment, and in support of his belief adduces the ease with which all can be hybridized. In this connection I take the liberty of quoting Mr. G. Reuthe, the able superintendent of the Thomas S. Ware Nurseries, in London, on the same subject: "*Lilium pardalinum* seems, in my mind, the easiest for crossing, and I have not the slightest doubt, judging by these results obtained under the most unfavorable circumstances, that most of the so-called species are natural varieties." If Nature, unaided, has not been quite

localities have the same type. As this is true of *L. pardalinum*, it is plain to be seen that, although a description based on a large number of specimens, all drawn from the same locality, may seem to its author quite definite, it becomes of little value when, by a wide acquaintance with localities, we find an endless chain of types varying to one side or the other of the published description. In such a species we may, like Mr. Burbank with his seedlings, select some form of unusual merit which we can maintain by propagation or by continuously collecting from the same locality. From the florist's point this is the proper thing to do. I fear that we will never be able to divide *L. pardalinum* into botanical varieties which the field botanist can follow.

Mr. Baker in his synopsis mentions variety *Californicum*, variety *puberulum* and variety *Bourgaisi*. In *Botany of California* the type and variety *angustifolium* are mentioned, and variety *minor* has also been described, I think, by Baker. The Lily which has been sold incorrectly for



Fig. 17.—Red Cedars in New England.—See page 142.

so lavish of her forms of this beautiful Lily as when assisted by so expert a cultivator as Mr. Burbank, she has yet been overbountiful in varieties of *L. pardalinum*, and I long ago gave up trying to fit them to published descriptions. In identifying or, more correctly, in attempting to identify the many forms which I have met in seventeen years of mountaineering, I had the advantage of Dr. Wallace's *Notes on Lilies*, which is undoubtedly the best guide, and includes Mr. J. G. Baker's *Synopsis of Lilies*. In addition to this, Dr. Wallace some years ago favored me with colored drawings of the varieties of this Lily, according to his work. I have seen plants which approximated these descriptions and drawings, but I have to confess that I have seldom seen or grown lots of this Lily which I could unhesitatingly refer to either variety. It is a peculiarity of many variable species of *Liliaceæ* on our coast, that while in a given locality a vast number of specimens vary within well-defined limits, scarcely two

some years as *Lilium Roezlii* is a form of *L. pardalinum*. *L. Roezlii* proper is different. Some of Luther Burbank's seedlings have been named, and the Thomas S. Ware Nurseries, in London, originated and named several hybrids of *L. pardalinum*. Of these *L. pardalinum*, var. *luteum*, is *L. pardalinum* × *L. Parryi*. *L. pardalinum*, var. *carminatum*, is *L. pardalinum* × *L. maritimum*. Mr. Burbank's beautiful hybrids of *L. pardalinum* on many species have not, I believe, yet been disseminated. In every way the species is extremely variable. I have seen it growing where stalks from seven to nine feet high were common. Four bulbs transplanted from this lot to my garden (a heavy clay loam) produced stalks the first year nine feet high, with from twenty-three to twenty-five flowers on each. Low-growing forms are not uncommon, but under favorable conditions five to seven feet is the ordinary height.

To give any accurate idea of the forms colored plates should accompany descriptions. In default of these I pass

to the forms in which *Lilium pardalinum* borders on other species. *L. pardalinum*, var. *minor*, is the connecting link with *L. parvum*, and being more nearly related to *L. parvum* I will treat it with that species.

In *Lilium Wareii*, as figured and described, we have a species which bears every indication of being the connecting link between *L. pardalinum* and *L. Parryii*. It is a clear yellow Lily, revolute as in *L. pardalinum*, fragrant as in *L. Parryii*. It has a rhizome which clumps up as in *L. pardalinum*, and comes from a region where *L. Parryii* is the common bog Lily. I think it not unlikely that it is a natural hybrid.

Lilium pardalinum and *L. maritimum* can be hybridized readily artificially, but, although in some spots the two grow together, I have never seen anything suggestive of natural hybridization.

Lilium Humboldtii and *L. pardalinum* grow in the same belt of the Sierra Nevada for hundreds of miles, and although *L. Humboldtii* is a Lily of the hillsides, and *L. pardalinum* of the meadows and stream-banks, they are frequently found close together. I have found but one Lily which even suggested a hybrid. That was in the Bear Valley, mentioned by Dr. Bolander, where a meadow of hundreds of acres was once full of a form of *L. pardalinum*. This is a grand form of the Lily, very heavy and strong, with flowers in which the scarlet scarcely shows at all. My first thought on seeing them was one of wonder that *L. Humboldtii* should grow in such a place.

Lilium Roezlii was first described by Regel. Mr. Baker gives as its locality "Rocky Mountains in Utah, introduced by Roezl into European gardens," also in Santa Cruz Mountains, California. It gradually disappeared from sight in Europe, and its very name became a synonym or was appropriated for a form of *L. pardalinum*. Two years ago a collector in southern Oregon wrote me asking if I wished *L. Parryii*, and the fresh flowers he sent proved to be a Lily plainly identical with the original *L. Roezlii*. It flowered freely with me last year, and I find it quite distinct. The bulb is close to *L. pardalinum*, but with little tendency to form clumps. The stem and leaves are pale, much as in some varieties of *L. pardalinum*. The flowers are colored exactly as in *L. Humboldtii*, but are more revolute, and the capsule is like that of the latter or *L. Columbianum*, and very unlike *L. pardalinum*. It grows beyond the range of *L. Humboldtii*, but both *L. pardalinum* and *L. Columbianum* grow in the same region, and it is a good medium between the two.

Lilium pardalinum is easily cultivated. The idea that it is a bog Lily has, perhaps, kept many from trying it. As a matter of fact, it is as easily grown in any good garden loam as potatoes. It does not like a soil that is sour and heavy, nor a very light sandy soil, but any fair loam, either sandy or clayey, suits it, and it will stand some manure. As to moisture it is not particular. I have often seen it in ground which becomes quite dry in midsummer. The ideal situation for it is in deep, loamy, well-drained soil close to running water, where its roots can extend down to moisture. It is a Lily to which every flower-lover should give a trial, and in eight cases out of ten it will be a success.

Utah, Calif.

Carl Purdy.

Cultural Department.

Southern Californian Ferns.

THE Ferns of southern California are especially noted for their beauty and grace. The California Gold Fern, *Gymnogramme triangularis*, is probably the most widely and favorably known species in cultivation, while the Silverback, or Bronze Fern, as it is sometimes called when old, is a close second in point of popularity. These are both easily grown, at least more easily than some other of our species, which is the main reason for their greater favor with amateurs.

Adiantum emarginatum is a special favorite of mine. It lacks, perhaps, the grace of *A. Capillus-Veneris*, or the Maiden-hair Fern of the eastern states (which also occurs in California), but possesses a richer coloring and beauty of habit

peculiar to itself. It grows in dry situations with the Gold and Silver Ferns, while the Maiden-hair Fern with us is restricted to perennially moist banks or cañons.

The Cheilanthes and *Notholænas* are a distinctive group of Ferns, adapted to a dry climate and able to stand long periods of drought. California and Mexico are both rich in species belonging to these genera—species that captivate the eye of the tourist, but, alas, are seldom responsive to the culture given them by the amateur. Yet they may be induced to grow and flourish by a skillful hand even years after they have been dried and placed in the herbarium.

The Lace Fern, *Cheilanthes Californica*, is one of the best known of southern California species, and perhaps the easiest of successful cultivation. The Cotton Fern, *Notholæna Newberryi*, is scarcely less favorably known to the tourist, and is most frequent in the composite productions with which he returns laden to the east. Cards with elaborately produced pictures, made from dissected Mosses and Ferns, are as familiar souvenirs of the west as the feather pictures brought away by the Mexican tourist.

Cheilanthes Clevelandii, a Lip Fern of more local distribution, is rarely seen in cultivation, and seldom enters into California Fern work, except from San Diego. Outside of San Diego its place is occupied by Fendler's Lip Fern, *Cheilanthes myriophylla*. It grows at a higher elevation in the mountains, but is scarcely more susceptible to cultivation.

On the confines of the inhospitable Colorado Desert, in cañons dry throughout a large part of the year, where the scant vegetation is subjected to intense heat, often about 140 degrees, Fahrenheit, we find Dr. Parry's Cloak Fern, *Notholæna Parryi*, *Cheilanthes viscida* and other Ferns, including what I believe is now properly called *Notholæna cretacea* (referred to in most works as *N. candida*). They are all small-growing species, the *Cheilanthes* seldom over six inches high, and the others with fronds only two to four inches long, as a rule.

The Chain Fern of our mountains, *Woodwardia radicans*, forms a striking contrast with its immense fronds, sometimes measuring ten feet in height, deep in the shade of some ravine with a perennial stream of water beneath its almost tropical luxuriance.

Pteris aquilina and *Adiantum pedatum* (the latter rare) are two Ferns which are equally at home in the mountains of California and of New England, and with the local variety *incisum* of *Asplenium Trichomanes*, our Feather Fern, are the principal species of our Fern flora not closely restricted in distribution.

Aspidium munitum, *Polypodium Californicum* and several species of *Pelæa* are peculiar to west America, the latter known as Tea, Wire and Cliff Brakes, locally.

Ophioglossum nudicaule is a dwarfish Adder's-tongue Fern, first found by Dr. C. C. Parry in southern California in 1850, and then lost sight of until 1884, when he was the first to rediscover it on our mesas in early spring.

Woodsia Mexicana is a rare Fern which I have occasionally found in the mountains of Baja California, near our boundary. We have a few other species, of interest to a botanist, but, I believe, entirely unknown in cultivation and not worthy of special mention.

San Diego, Calif.

C. R. Orcutt.

Ouvirandra fenestralis.

IN the Royal Botanic Gardens at Edinburgh this singular aquatic, commonly known as the Lattice, or Lace Plant, has been very successfully grown for the last twenty-five years. It was started by the late James McNab, who had a happy knack of hitting the right treatment for many newly introduced plants. Since its introduction many specimens have measured over four feet in diameter; the plants flower annually, the seeds ripen and float on the surface of the water where they germinate in a few days after ripening. Seedlings are, however, hardly worth bothering with when old plants are available for the purposes of propagation, as they take too long to make fair-sized specimens. The plants at Edinburgh are grown in shallow oak tubs, about five feet in width; they are placed on a row of hot-water pipes in one of the warmer houses where the temperature of the water seldom falls below sixty-five degrees, Fahrenheit, and ranges from that figure to eighty degrees. The surface water is agitated about three times a week by adding a little water with the hand-syringe. Care is taken to keep the plants shaded from the sun, and when any confervoid growth appears on the leaves the light is excluded for a day or two at a time by means of a tarpaulin drawn over the tops of the tubs.

By imitating those conditions we have been enabled to grow the *Ouvirandra* into quite large specimens in the gardens here;

its greatest enemy is confervæ, which will adhere to the leaves whenever there is a sufficient amount of light, but with a heavy shade on the glass of naphtha and white lead this growth can be kept in check. The plants will throw larger leaves when they are shaded from direct sunlight. In places where it is not desirable to have shading, the common *Azolla pinnata* grown on the surface makes an excellent substitute, but this has to be brushed aside in order to see the *Ouvirandra*. The soil for fairly large plants should consist of loam finely sifted three parts, and one part made up of broken charcoal, fine gravel and rotten cow-manure. At potting time this should be mixed and put in a condition which would be considered too wet for potting ordinary plants, so as to prevent the mass from softening in the pot after it is placed in the water. The surface of the pot should be finished off with light-colored gravel or broken rock in order that the fine network of the leaves may be more easily seen. The pot should be just low enough in the water to insure the covering of the leaves, and no more. Should the leaves become covered with sediment of any sort the plant should be taken out and the leaves syringed, one person holding the leaf-blades flat against the hand while another manipulates the syringe. *Ouvirandra* is most easily propagated by dividing the crowns; one fair-sized offset should make eight or ten breaks within a year. The plant dislikes sudden changes in the temperature of the water, and if subjected to such treatment it is almost certain to lose its older leaves, and those which are growing do not attain their full size.

Botanic Garden, Washington, D. C.

G. W. Oliver.

Notes from the Botanic Garden of Smith College.

THE raising of seedlings is one of the most important and one of the most interesting operations of botanic garden work, especially where large numbers of species are included. We have some seven hundred species germinated from seed sown this spring. Two-thirds of these are intended for the beds (which are planted in families) outside, while the remainder are greenhouse species and Cacti. To accommodate this number it is important to raise them in the smallest possible space. To this end we sow almost all our seeds in four-inch pots, one species in a pot. We have found this size to be best adapted for the purpose, a size larger being cumbersome, while in a size smaller the soil dries out too rapidly. The tropical species and Cacti are raised in the propagating-house, which is kept at a temperature of about seventy degrees. The hardy and cool greenhouse species are raised on the north side of the warm temperate house, on a temporary stage, which brings them as near the glass as possible. We have found that hardy perennials germinate much better in a temperature of fifty-five degrees than in a cooler temperature. We use a light rich soil, made very fine and porous on the surface. For the Cacti the pots must be well drained, and we usually mix a little powdered charcoal with the surface soil, and also a little more sand than for ordinary seedlings, as they have to remain in their seedling pots for one year at least, and often three years, according to the genus. *Cereuses* and *Opuntias* may be potted off singly in one year, while the slow-growing *Mamillarias*, *Anhaloniums*, *Echinocactus*, etc., require two years at the least before they are sufficiently rooted to pot singly.

All the seedlings require careful watching in regard to watering especially, and if any show signs of damping they must be transplanted into fresh soil at once, and this is generally a preventive. As we only require about eight plants of each of the hardy perennial seedlings, we transplant them into two other four-inch pots as soon as they are large enough to handle; these by the end of May are of suitable size for planting, either in their permanent position or in nursery lines for fall planting. This method of raising seedlings, I think, might be employed with advantage commercially, for as many as two or three hundred seedlings of some species may be germinated in a single four-inch pot.

Northampton, Mass.

Edward J. Canning.

Rose Hybrids.

ROSA WICHURAIANA is a plant probably familiar to most of the readers of GARDEN AND FOREST, since its peculiar characteristics and merits were first noted in its columns. The general garden public has had its attention more especially called to it lately under the name of the "Memorial Rose." It is doubtful whether superintendents of trimly kept cemeteries have welcomed it as a boon, for it is a great Rambler and not a plant to be allowed over grass. On sandy, bare soil where few things will grow, or over sloping banks or rocks, it is very

valuable and effective, being not only a rapid, vigorous grower, but perfectly hardy in the worst seasons. Its thick, smooth leaves are little subject to insect pests. Its principal value for ordinary positions, however, would be for use as a pillar Rose, a class of plants for which purpose we have comparatively few varieties that make very long growths and are entirely hardy. The fragrant, beautiful clusters of the single white flowers leave little to be desired. It seems to hybridize readily, and Mr. W. A. Manda, of South Orange, New Jersey, has secured a lot of charming hybrids which have all the merits of the parent plant in hardiness and vigor, and have in addition a great variety of flowers. Mr. Manda has made crosses with a number of tender Roses, mostly Teas, and has secured flowers which are single, semi-double and very double, and white-pink and dark pink (or rose) in color. Last week in Mr. Manda's propagating-house there were some of the double-flowered plants which had been lifted, cut back and forced into bloom. This variety, known as "Manda's Triumph," has a snow-white flower with petals perfectly imbricated and about two inches in diameter. They grow in clusters of twenty-five to fifty or more blooms. One of the prettiest of these hybrids is a single-flowered pink one, known as the "Roamer." There is also a variety which has only a slight suffusion of pink in the white.

These are not forcing Roses, however, and I was drawn to South Orange mostly to see how the plants had wintered in the open, where they had been exposed on a sandy bank. Plants said to be hybrids with *Madame Hoste* and *Meteor* had old growths in some cases twelve feet long, and these were alive for their full length; in fact, the plants seemed entirely unaffected, except in some soft late growths, and these in some cases were not entirely lifeless. These hybrids seem to me an interesting and valuable genus.

Elizabeth, N. J.

J. N. Gerard.

Bamboos in Florida.

THE most striking and interesting features in many Florida gardens are the immense clumps of Bamboos. Planted with the charming evergreen *Magnolia*, the striking *Camphor Tree* and such Palms as the massive *Phoenix Canariensis* or *Cocos Australis*, they always command attention by their distinguished appearance.

While on a visit to Florida last November and December I paid special attention to the different species of these giant Grasses found in cultivation. The tourist gets the first glimpse of them while crossing the southern parts of Alabama and Georgia. On both sides of the railroad track there are to be seen in moist ground almost impenetrable masses of our native *Arundinaria macrosperma*. In the lower Mississippi valley, as far north as southern Illinois and Indiana, immense stretches of the low ground are covered with these "canebrakes." The first specimens of the more ornamental Asiatic species I found in the St. James Park at Jacksonville, Florida. I frequently occupied a bench underneath a few broad spreading *Hollies*, *Ilex apoca*, about twenty feet in height, to enjoy the beauty of a magnificent clump of *Arundinaria Japonica*, *Bambusa metake*, scarcely seven yards away. This plant is about twelve feet high and twenty feet in diameter, forming a semi-globular mass of the densest and richest green imaginable. The stems, which are highest and strongest in the centre, are not crowded in a mass around the root-stock, but they stand from one to two feet apart. Every stem stands upright and is furnished two-thirds of its length with broad evergreen foliage. All the culms clustering around the plant are smaller and shorter than those more in the centre. Mocking birds and many of our feathered winter sojourners, like juncos, white-throated and white-crowned sparrows, catbirds, etc., find exceedingly congenial and safe retreats among this mass of green. This particular specimen is so beautiful that it is worth quite a journey to see it. Having been planted five years ago it was killed to the ground during the great freeze on February 7th, 1895. At present it is as beautiful as ever. There are several smaller specimens in the same ground, which in a few years will have attained the same proportions. Several plants of *Bambusa argentea* (probably *B. verticillata*) do not look as promising, and *B. vulgaris* is not at home so far north.

The most beautiful as well as the largest Bamboos were seen in the gardens of Orlando, over a hundred miles farther south. The species commonly met with is the large unarmed Bamboo of Bengal, *Bambusa vulgaris*, usually called the Giant Bamboo. Everywhere in the charming subtropical gardens in the town it forms masses of noble aspects. When well established, heavily fertilized and frequently watered, it grows at such a rapid rate that in the course of about five or six years immense clumps thirty to fifty feet high, and as much in diam-

eter, are formed. Several specimens are known whose stems have reached their full height of over seventy feet in sixty days. The first growth of canes is usually made by the middle of July. All the buds that start after the middle of September perish, and no more growth is made until the following July. The culms in their first season stand erect with few branches and with only terminal leaves. The second season they feather out and become heavy with foliage, curving over gracefully to all sides. During the disastrous freeze of February 8th, 1895, all the specimens of this Bamboo were killed to the ground, but they pushed up new shoots in July, and at present no trace of the frost is visible. Clumps forty to sixty, and even seventy, feet high, and as much in diameter, are very picturesque. All the stems are crowded together around the root-stock, the exterior ones especially arching over to all directions by the heavy weight of the dense mass of foliage. In one of the larger gardens where grand masses of Bananas, a great clump of *Alpinia nutans*, about ten feet high, immense specimens of Pampas Grass, and a fine tree of the common Date Palm surround it, this Bamboo is at least sixty or seventy feet high, the immense culms gracefully arching over, covering at least a space of a hundred feet in diameter. This clump stands on low ground and near a hydrant, where it is frequently watered during dry weather. The abundant, large, velvety foliage of this species has a slight trace of yellow in its green color, which gives it a distinct individual quality. It never forms suckers at any distance from the root-stock like most of the species of *Phyllostachys*, which become a nuisance when not constantly watched and kept within bounds.

Bambusa arundinaria, the Thorny Bamboo of India, is almost as beautiful as *B. vulgaris*, and it grows much in the same manner. As its stems are stronger they stand more erect and do not arch to all sides. At a distance a small specimen looks much like a gigantic Tree Fern. It is not as yet a common species in the gardens, and there are only a few specimens planted a few years ago that have attained a height of scarcely twenty-five feet. There is a pretty specimen on my place on high Pine land that is very promising. The prospects are that in a few years hence this species will rival in beauty and size the *Bambusa vulgaris*.

Dendrocalamus strictus is an exquisite species of gigantic proportions. Of late years it has been distributed over many parts of the state with *Bambusa arundinacea* by the wide-awake firm of Reasoner Brothers, of Oneco, Florida. As it flourishes to perfection on high and dry Pine land it is of particular value. The species is difficult to propagate, and therefore it will only become more abundant in the course of time. All the specimens I have seen were young plants, but in a few years they will have grown into gigantic clumps. The strong culms are crowded together around the root-stock, and they are scarcely arching over on the sides. Like the two foregoing, this species is strictly tropical, young unprotected plants having been killed outright when the mercury fell as low as nineteen degrees, Fahrenheit, on February 7th and 8th, 1895. It is said to be one of the mightiest Bamboos in existence, reaching a height of over one hundred feet in its native country, India. It has not been grown long enough in Florida to say with any certainty what size it will acquire.

The most common Bamboo in the gardens of Florida is *Bambusa argentea* and its variety, *B. argentea striata* (probably this is *B. verticillata*). I have found many magnificent specimens even in the gardens of the backwoods. The leaves of the type are of a rich green, with a glaucous underside, while in the variety they are prettily variegated with creamy white. Specimens twenty feet high are frequently met with, and the root-stock of such is estimated to weigh several tons. All the canes are crowded together, arching over on the sides near the ground. In the centre they all stand upright. The tops of the stems are not furnished with masses of foliage like the foregoing species; in fact, in the upper half the foliage is rather scant, the density of the plant being lower down. It is a plant of great beauty, though much less ornamental and refined than the foregoing species. It grows well on high dry Pine land, but there its leaves are of a rather yellowish hue.

Thamnocalamus Falconeri (*Bambusa falcata*), from the Himalaya region, I have only seen on my own place in Orange County. It is a small but exceedingly beautiful plant, rarely growing more than ten or twelve feet high and as much through. Its thin slender stems are densely clothed with small Fern-like foliage of a beautiful light velvety green color; the underside of the foliage has a glaucous hue. In my garden I have also the following species:

Phyllostachys violascens, *P. nigra*, *P. aurea*, *P. viridi-glaucescens*, *P. Castillanis* and *Arundinaria Simoni*, all desirable species. Though planted several years ago, they have not

made large clumps as yet, but some of them have sent suckers to all directions, so that my man has difficulty to keep them in bounds. Like most Japanese plants, they appear to be perfectly at home in Florida, and they would have formed strong specimens were they planted in moist rich soil. *Phyllostachys Nigra* has jet-black stems, and *Arundinaria Simoni*, which grows thirty feet high, is distinguished by its many fine branches and dense masses of small variegated leaves. A part of my grounds near the beautiful small Lake Audubon, where the soil is deep and moist, has been set aside for a Bamboo garden. Those planted out already flourish admirably.

There are quite a number of other beautiful tropical Bamboos which should be introduced by our enterprising nurserymen. To do their best, Bamboos need much water and a very deep rich soil. They need heavy fertilizing, and should be mulched each year with a thick layer of stable manure.

Milwaukee, Wis.

H. Nehrling.

Correspondence.

Notes from West Virginia.

To the Editor of GARDEN AND FOREST:

Sir,—By a very natural error in punctuation I was made to say in No. 476 of GARDEN AND FOREST that such plants as *Saponaria ocymoides*, hardy Candytufts and Creeping Phloxes were a mass of bloom in my garden late in March. What I meant to say was that these plants were masses of healthy evergreen verdure. Even in the earliest of springs I have not seen any of these plants in bloom before the middle of April, and up to this time (April 8th) none of them have shown a flower. We have now, however, enough early bloom to make the garden bright and to repay richly all our care. The most conspicuous ornaments of the home grounds at present are some fruit-trees, planted for their beauty and also to screen outbuildings, in which latter position they have evergreens for a most effective foil and background. The first of these to flower were the Hard-shell Almond-trees, which are not often planted for ornament, but which are very charming when used in this manner, as they have large pale pink blossoms very early in the season. These were quickly followed by the Nectarines and Apricots. The bloom of all these trees comes before the leaves, and therefore the background of evergreen foliage is necessary to bring out their full beauty. A large old Plum-tree planted close to the south side of the house was two days later than the Almonds in flowering. I do not know the name of this Plum, which is at least twenty-five years old. It bears no fruit, but at blossoming time it covers itself with delicate bloom and tender green foliage, and it is earlier by about a week than *Prunus Simonii* and the Purple-leaved Plum, now just coming into flower. There is no tree like it in this neighborhood. I have no *Prunus Davidiana* with which to compare it in earliness of bloom.

The dull chocolate-colored flower-sprays of the little shrub, Yellow-root, *Zanthorhiza apiifolia*, are interesting, but neither fragrant nor showy, and the plant does not seem to thrive in our soil, as it does not spread or increase in size. It is associated with Spice-bushes and Leatherwood in the shrubbery, all of which bloom at the same time and suggest our native copses. It is therefore well to plant them together in the wilder parts of the home ground where these are of ample size. Forsythias are now in full bloom, and are, of course, the most conspicuous of early-flowering shrubs.

The Japanese Weeping Cherry is expanding its flower-buds of rich carmine, which develop into blossoms of a paler shade. The ground around our largest Weeping Cherry, which is a beautiful full-grown tree twenty feet in height and of most graceful and picturesque habit of growth, is carpeted with single Hyacinths, white, pink, buff and blue, naturalized in the grass. It is true that Hyacinths deteriorate in size of bloom when planted in this manner, nevertheless the effect of this grouping about the Weeping Cherry, with its long pendent branches clothed in delicate rose-color, is very good, and much more to our taste than the stiff rows of double-flowering Dutch Hyacinths one so often sees primly disposed on naked soil in a garden-bed.

We are now much interested in establishing a wild garden for hardy Ferns and wild flowers from the cliffs of the Potomac, which rolls past our little village, and from the neighboring country. Expeditions to these cliffs result in adding to our collection as many as eight species and varieties of Fern in a single morning. We plant them in crevices of the rocks and on and around stumps of trees, set in their native Mosses, for almost all of these Ferns grow naturally on Moss beds that cover the overhanging rocks of the river cliffs. Hepaticas

and Columbine, Rock Cress and Saxifrage and many other wild flowers are planted with the Ferns. We feel sure, among other delightful "finds," that we have discovered *Sedum Neviusii*, a rare plant, growing on our cliffs. This *Sedum* was discovered and named a generation ago by Dr. Nevius, a clergyman of Alabama, on rocky cliffs near Tuscaloosa, in that state. It has also been found—I quote from Mr. Meehan, in his *Native Flowers and Ferns of the United States*—on Salt Pond Mountain in Virginia. We are impatient for its bloom, in order that we may be sure we are not mistaken in supposing that our plant is the true species.

Delicate pink and white Rue Anemones are now blooming in our fernery in company with graceful fronds of common Polypody, beds of Walking Fern, tiny plants of *Asplenium Trichomanes*, *A. Ruta-muraria* and larger plants of the Rock Brake, *Pteris atropurpurea* and its near relative, *Pteris gracilis*. Here, also, we have our collection of Mosses of this region, but, alas, I am not enough of a botanist to know even the names of most of them. What book on American Mosses and other flowerless plants would be the most helpful to an amateur botanist who wishes to begin the study of these plants?

Rose Brake, W. Va.

Danske Dandridge.

[On Mosses, Lesquereux's *Manual* is the standard work, and Barnes' *Key*, published by the University of Wisconsin, should go with it. On Ferns and Hepaticæ the chapters in the last edition of Gray's *Manual* or Underwood's *Native Ferns* can be consulted.—Ed.]

The Nomenclature of the Spruces and Firs.

To the Editor of GARDEN AND FOREST:

Sir,—I trust you will give me a little space in the columns of your journal for a few remarks upon the nomenclature of the Spruces and Firs, in which I am much interested, and especially so since the discussion of this subject by Mr. Jack and Professor Greene has appeared in this journal. I, in common probably with many others, have noticed the difference between the dates of publication of the genus *Abies* and of the species *A. balsamea* as given in several of our recent publications. The publication of the species is made to antedate that of the genus by twenty-one years, an oversight which is scarcely excusable in those who have made the subject of priority of publication a matter of special investigation. Professor Greene says that Duhamel published a genus *Abies* in 1755, but fails to state what his type was; was it limited to *Abies* as at present understood, to *Picea*, to *Tsuga*, or did it contain all of these genera? I trust that Professor Greene will enlighten us upon this point, as it is a most important one, for, if it does not apply to *Abies* as at present understood, it will necessitate a shifting of generic names and new combinations. Now, in reference to *Abies Canadensis*, Miller, *Dict.*, ed. 8, No. 4 (1768), I think it can be shown that it is nothing more than a synonym, pure and simple, of *Pinus Canadensis*, L., *Sp. Pl.*, ed. 2, 1421 (1753). In the latter work Linnæus uses the descriptive phrase, "*P. foliis solitariis linearibus obtusiusculis submembranaceis*," quoting as primary synonymy, "*Abies foliis solitariis confertis obtusis membranaceis*, *Gron. Virg.*, i., 191," and as a second synonym, "*Abies foliis piceæ brevioribus, conis parvis biuncialibus laxis*, Mill. *Icones*, i., t. 1" (1760). Five years later Miller published his *A. Canadensis*, first using Linnæus' descriptive phrase, "*P. foliis . . . submembranaceis*," and adding as a second synonym his own earlier description, "*Abies foliis . . . laxis*," just the same as Linnæus had done under *Pinus Canadensis*. Therefore, as the description and principal synonym of *Abies Canadensis*, Miller, is the same as for *Pinus Canadensis*, L., and, in fact, is mainly taken therefrom, the two names must be considered as applying to the same plant, which is the Hemlock, *Tsuga Canadensis* (L.), Carr. As indicated by Professor Sargent, the proper name for the White Spruce should be *Picea laxa* (Ehrh.), Sarg.

Detroit, Mich.

O. A. Farwell.

Notes from Carlton Hill, New Jersey.

To the Editor of GARDEN AND FOREST:

Sir,—The sixty or more hot-houses of Mr. Julius Roehrs are near Carlton Hill, New Jersey, twelve miles out on the Erie Railroad. Much of the stock seen here last week was for the Easter trade, and many of the houses were brilliant with bloom. However, in so great an establishment much space was occupied by plants grown for other seasons. Not a few of

the houses, for economy in wall-space and heating, are unseparated, except by supports of cedar posts, and eight adjoining houses, each one hundred or more feet in length, made a luxuriant field of Palms and other foliage plants. These have almost no demand now, and are the specialty for autumn trade, as plants in flower are for spring. A house of *Araucarias* was particularly beautiful and very thrifty, as, indeed, were all the foliage plants. The type, *Araucaria excelsa*, and the varieties known as *Glaucæ* and *Robusta* are all grown in quantity; the deep green of the older leaves and the tips of new growth of a lighter shade made a beautiful effect in the great collection of plants now three years old and imported from Belgium two years ago.

Among the less common flowering plants for Easter were a house of French Lilacs, those intended for market now about two feet high and well covered with opening trusses. Specimens of the once popular Bottle-brush, *Metrosideros*, were well flowered, as were trimmed plants of *Bougainvillea Sandersoniana*, which Mr. Roehrs considers extremely useful on account of its dwarf habit and its abundant flowers, which can be forced at this season. About a dozen plants of the Rose *Acacia*, *Robinia hispida*, were observed with their deep pink flowers. The selected plants of *Kalmia* ready for Easter looked well to the casual observer, though Mr. Roehrs said the imported stock proved poor and unsatisfactory this season. The distinct tints of thickly flowered plants of Ghent Azaleas were conspicuous, and very densely berried plants of *Ardisia crenulata* made a brilliant display near the green and white of a collection of *Choisya ternata*. The latter has a very uncertain sale, as it is but little known. There were plants of *Cytisus* and of *Acacia racemosa* three feet high, the spiny branches closely covered with the small leaves and globular clear yellow flowers. Moss Roses, Baroness Rothschild and Ulrich Brunner Roses filled several houses and bore a plentiful supply of buds. Mr. Roehrs considers these two hybrid Roses the only ones which bloom freely enough to compete with the steadily improving Tea Roses. He remembers when Magna Charta roses were readily sold for \$18.00 a dozen at wholesale for Christmas, while \$6.00 is their current value in midwinter. Too many of the hybrid Roses come blind, and thus prove unprofitable, while Tea Roses bloom naturally and continuously. There is, however, no great profit in growing Baryness Rothschild and Ulrich Brunner specially for Easter, as the time cannot be accurately measured, and some of the roses are mature two weeks earlier than Easter, and must be cut, while slower plants are belated a fortnight in flowering.

Lilies, Azaleas, Rhododendrons and Hydrangeas comprised the main Easter stock. Only *Lilium longiflorum* was grown here this year, some 7,000 bulbs being in flower, and these tall stalks bore an average of five exceptionally large and vigorous buds. Most of the Azaleas were of medium size for use in ordinary living-rooms, though there were some large plants which will be returned by their temporary owners after the flowering season is past. Three to four thousand of these showy plants comprised all the best varieties and colors. So much time and money is necessary to grow large plants to perfection that Mr. Roehrs finds those of medium size more profitable, and they are also in greater demand. But even these have dropped one-third in price in recent years. The most showy Azaleas were plants of the brilliant carmine *Le Flambeau*; Siegfried, a clear scarlet with a suggestion of salmon, and almost free of marking; C. B. Brigham and Apollo, of a deeper shade; Helen Thildeman, a good double pink; Professor Walter, darker than *Vervæneana* and an improvement on this popular pink variety. Bernhard André alba was the best white seen here, and Raphael is a little sensitive so late in the season; these, with Garten-director of France, white, with markings of scarlet in clearly defined sections, were among the best sorts. About three hundred plants of Rhododendrons of various species were in flower. The houses of Hydrangeas were hardly less showy than those of Azaleas, and compact plants carried good heads of many-colored flowers, various shades of blue, pink, lavender and green making a unique effect.

Narcissi are sparingly grown, and most of the Tulips were white ones, the green-tipped flowers making a pleasing show in the leathery glaucous leaves. Lily-of-the-valley is one of the staple crops here, and about 100,000 pips were being forced.

Orchids are grown for cut flowers, and four houses contained resting plants of *Cattleya trianae*, *C. Mossiæ*, *C. Gaskelliana*, *C. labiata* and *Dendrobium formosum*. A house of *Swainsonia* was observed, and a group of standard Orange-trees two feet high and coming into fruit, besides smaller Otaheite Oranges in flower. Forced hardy shrubs were once a specialty with

Mr. Roehrs, such as flowering Almonds, Deutzias and Spiræas, but their blooming season is short, so that it is difficult to have them at their best at exactly the right time, and then they do not keep longer than a few days in the buyer's hands. The lateness of Easter this year has had a favorable effect on the plants, which have been forced gradually, with no hurry, and it is always easier to hold plants back from flowering than to urge them in advance.

New York.

M. B. C.

Notes.

New-crop limes from Jamaica, small and green, may now be had at fifteen cents a dozen, or \$1.25 for 100.

A consignment of 180,000 Easter lilies arrived in this city on Sunday by the regular steamer from Bermuda.

Trailing Arbutus, from woodlands in Massachusetts and other neighboring states, is the newest offering in the up-town flower-stores, and a compact little bunch costs but twenty-five cents.

It must not be considered that the few western Senators who make most of the noise in Washington against President Cleveland's forest reserves represent the best public opinion of their section. The Senators and Representatives of California all support the reservations, and on the 27th of March the Sierra Club of San Francisco passed a series of resolutions which endorse the action of the state's delegation in Congress, favor the reservation principle and urge that as far as possible the forests thus set apart shall be policed by the army.

Professor Roberts, of Cornell University, is sending out circulars to notify whom it may concern that under the Agricultural Extension Bill the college of agriculture of that university has undertaken to assist, free of expense, all teachers who wish to introduce what is called "nature studies" into the public schools. Nature study means nothing more than seeing familiar things in a new light, and the Cornell faculty wish to encourage the investigation of common objects so as to teach accurate observation and the power of clearly expressing what is seen.

Mr. F. W. Burbidge, in an address on the culture of hardy bulbs in England, said that 100,000 Hyacinths or Narcissus may be grown on an acre of land, 115,000 to 120,000 Tulips, while of smaller plants like Crocuses, Snowdrops, Squills, Anemones, Winter Aconites, etc., the number runs up to 200,000 and 300,000 an acre. He believes that any hardy bulb which brings more than one pound a thousand in the market can be cultivated with profit in many parts of England. Professor W. F. Massey, of North Carolina, has long been of the opinion that the cultivation of bulbs could be made a successful industry in that state.

Mr. Wilhelm Miller, who is a special student of horticulture in Cornell University, has prepared a bulletin on Dahlias, which is published by the experiment station, and which is much more than a mere test of varieties although it gives the habits, form and relative value of some 350 different named varieties which were grown at Ithaca last year. In the first place, there is an interesting history of the plant and of its evolution to its present freedom and grace of outline and poise since the introduction of the Cactus Dahlia. The illustrations show some of the best forms of the flower which recent crosses have produced, and the thirty-five pages which make up the bulletin are all filled with interesting and instructive matter.

Professor Morse, of the New Hampshire Experiment Station, writes to the press of his state that ashes are now delivered in car-load lots at railroad stations at \$10 a ton. This low price, however, is accompanied by a deliberate reduction in the quality of the ashes. Buyers should look with suspicion on lots which appear excessively moist, for in such cases the potash is seldom equal to the proportion in the average product. Certain samples analyzed were from burned rubbish, principally of waste paper and refuse lumber. It is a fact which should be generally known, that ashes from paper are as valueless as ashes from coal, because the soluble mineral matter has all been leached out of the paper stock during the process of manufacture.

We have already spoken of Professor Halsted's experiments with Potatoes with reference to the disease known as the scab, Oospora scabies, and a recent bulletin gives interesting details of the work of the last year. It seems to be proved that the

soaking of the seed potato in a solution of corrosive sublimate will not greatly check the disease if the soil itself is infected, although if the poison is added to the soil it will check the scab. Sulphur maintained its position as the best remedy, and its wholesome effect on the soil remains undiminished through the second year, and no one knows how much longer it will prove useful. Kainit, besides being a good fertilizer, has been proved to have a considerable fungicidal value.

The Saghalien Knotweed is a strong perennial herb with creeping root-stocks, and it has been cultivated for twenty-five years in the botanical gardens of Europe. A few years ago, in time of drought in France, it was discovered that cattle would eat the leaves and tender branches of this plant, and the suggestion was made that it might prove valuable as a fodder-plant. In a year or so extravagant accounts of the value of this Polygonum Sachalinense appeared in some American seed catalogues, but the Director of the Maine Experiment Station issues a renewed warning against trusting it. It is not probable that American farmers will realize the hopes which have been raised by the glowing descriptions of this plant from Europe. We should be very glad to publish the experience of any one who has tried it.

The sweet or saccharine Sorghums are now successfully grown in almost every state and territory of the Union, and although there has been a decrease in the acreage of these Sorghums planted for the manufacture of sugar and molasses, the acreage sown for forage has increased very materially. Mr. Thomas A. Williams, the Assistant Agrostologist of the Department of Agriculture, has prepared a bulletin on Sorghum as a Forage Crop, which in the scope of twenty pages groups together the results of experiments in many of the stations and elsewhere throughout the Union. Among the facts brought out are that Sorghum endures drought better than Corn, and will do better on thin soils, being a stronger feeder; that the early varieties are preferable for forage; that the seed should not be sown until the ground becomes warm, and then plenty of it should be used in a well-prepared bed; and that irrigation should be practiced where it is possible. It is good practice to plant Cow Peas or other Legumes with the Sorghum, not only to improve the quality of the forage, but to leave the land in better condition. The crop can be used for soiling, pasture, ensilage or hay, and the best quality of hay is obtained by cutting the plant shortly after it begins to bloom. For soiling it can be cut profitably as soon as the heads are formed, while for silage it is best cut when the seed is in the "dough." Sorghum is a native of the tropics, but it is a most adaptable plant, and varieties have been developed which are perfectly hardy as far north as Canada, and every one who has a farm and reads this bulletin will be tempted to experiment with it as a forage plant.

Above 51,000 packages of fresh vegetables from the south were received in New York during last week. Besides 20,000 barrels, crates and boxes of new cabbage, peas, beans and tomatoes, there were thirty-four packages of cucumbers, 728 of lettuce, 17,318 of spinach, 12,195 of kale, 4,051 of radishes and 1,394 of asparagus. This does not include receipts of vegetables forwarded by express, but the general shipments by steamships and ordinary passenger and freight trains. Besides these domestic products, there were onions from Bermuda, Spain and Turkey, and potatoes from Scotland, Germany, Bermuda and Cuba. Asparagus now comes from North and South Carolina and Virginia, and the first cuttings are being shipped from Maryland. The white shoots cost forty-five cents, and the tender green stalks fifty-five cents a bunch in Washington Market. Beets, from Florida and South Carolina, bring ten cents a bunch, and cabbage, from the same state, ten cents a head. Celery comes from California and Florida, and cucumbers from the latter state and from Boston hot-houses. Eggplants from Florida command twenty to twenty-five cents. Kale comes from Maryland and Virginia, as does spinach. Peppers are supplied by Florida, as are string-beans, lettuce, squashes and tomatoes; the latter now sell for twenty-five cents a pound. Peas, from Georgia and South Carolina, sell for seventy cents a half-peck. Radishes come from Virginia, and parsley from Bermuda; 26,500 crates of onions came from these islands last week, also 800 barrels of potatoes, which bring fifty cents a half-peck at retail. Sweet potatoes, from southern New Jersey, cost twenty-five cents a half-peck. Dandelion gathered from fields and commons brings ten cents a quart, and that which is cultivated and blanched realizes twice that price. Okra costs ten cents a dozen, and mushrooms fifty cents a pound.

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The Care of Park Trees.

WANT of technical knowledge makes it easy, apparently, to discuss in print the complex and often difficult conditions which affect trees in urban parks, and makes their critics peculiarly eager to blame park managers when they attempt to improve park plantations by necessary thinnings. Ill-advised protests against cutting trees menace the beauty and usefulness of every American park, and in some of our cities this has been carried to such a point that park commissioners and superintendents are so intimidated that the plantations under their charge are abandoned to their fate, or, if a tree has to be cut down, it is done surreptitiously. We have over and over again called attention in these columns to the importance of judiciously thinning park plantations, taking the side of experts against theorists, and maintaining that if the greatest possible enjoyment is to be obtained from public parks they must be managed by men who understand their business.

This subject has recently been attracting a good deal of attention in Boston, where correspondents of the daily papers, usually signing themselves "artist," have been vigorously protesting against the much-needed thinnings which have been made this year in the park plantations. Boston a few months ago was fortunate in securing the services of an educated, well-trained and efficient Park Superintendent, who has become the executive of the Board of Park Commissioners. The new Superintendent saw at once that the park plantations placed in his charge were in a deplorable condition. The trees, as we pointed out in these columns a few months ago, were overcrowded, full of dead wood, improperly nourished and suffering from the attacks of various insects. Nothing had ever been done to these woods and groves since the city purchased them several years ago, and they have been in an unsatisfactory and dangerous condition. The first thing to be done, of course, under such circumstances is to remove dead and dying trees, to cut out unnecessary saplings, which often spring up like weeds in neglected parks and plantations, and to furnish room and admit light to the more promising trees. This the new Superintendent

proceeded gradually to do, and it is this attempt to improve the Boston parks which has raised such a storm of protest from persons who, forgetting that parks are not primeval forest, declare that the natural beauty of the Boston park woods and plantations is being destroyed. Such critics never remember that provision must be made in parks for the free enjoyment and circulation of great crowds of people, and that in order to afford such facilities for the public natural forest conditions must be more or less sacrificed. Few people realize that the sylvan charms they plead for can only be secured with the aid of healthy trees, and that trees which are overcrowded, half-dead and full of insects can never produce the results they demand. Segregations of human beings in cities and their suburbs so change natural conditions that woods in urban parks cannot be left exclusively to the care of nature, however attractive this may sound in the mouths of enthusiasts; and man must adapt his plantations to the unnatural conditions he has provided for them.

This whole subject is of such vital importance in its relation to the artistic and practical value of American parks that we have taken occasion to examine carefully the effects of the tree-cutting which has been done in the Boston parks during the past winter, and our criticism upon it is that the new Superintendent, desiring probably to feel his way in a community new to him and unfamiliar with local conditions, has nowhere yet sufficiently thinned the plantations in his charge, and that the Boston parks, like those in every other American city with which we are acquainted, are still suffering from insufficient tree-cutting.

A Garden for Children.

WE have already called attention to a series of leaflets prepared for the teachers of rural schools in the state of New York, under the direction of Professor Roberts, Director of the Ithaca Experiment Station. Under a state law enacted for the purpose of extending the work of the experiment station so as to give an impulse specifically educational to the farmers of the state, several plans are under trial. Itinerant or local experiments have been used as a direct means of teaching. Bulletins have been issued on various subjects like apple-culture, etc., in which the theory and practice is briefly explained, and the history and condition of different branches of rural industry have been written in an attractive way. Horticultural institutes or schools have been held in different towns and cities of the state, and courses of reading have been prescribed in connection with correspondence with the teachers in the Agricultural College. One of the latest efforts is an attempt to establish the study of nature in rural schools, and it is to encourage this that the leaflets of which we have spoken have been prepared. These little bulletins were primarily intended for the teacher, and were meant to suggest the ways in which he can interest his pupils at odd times in some natural object or process. Of course, they may be given directly to the advanced pupils for the purpose of suggesting to them experiments and observations and for encouraging them to examine objects for themselves to form conclusions of their own and to state them in their own language. Four of these illustrated leaflets have been published, in the first of which the pupils are asked to investigate the way in which a Squash-plant gets out of its seed; in the second, a burning candle is the object of study, and in the third they are asked to examine an apple-twigg and trace the history of its fruit-spurs, its flower-buds, its leaf-buds, its branchlets, etc. This third leaflet will be found full of interest and suggestion to many grown-up children who call themselves educated. A fourth leaflet is for pupils rather than teachers, and it requests every school child in the state to grow a few plants during next summer. The only way to learn how plants grow is to grow them, and personal investigation is the only way, as the leaflet suggests, in which one can become intelligently interested in anything that lives and grows. The specific request is

that the children shall grow two kinds of flowers, Sweet Peas and China Asters, because the seeds of each are cheap, they are easy to grow, they are handsome and both come in various colors. There are brief instructions about selecting the ground, making the bed, how and when to plant the seed, the varieties to select, and how to care for and water them. In all cases the reasons for a given treatment are suggested. Inasmuch as the experiment station has had a bulletin on each of these plants any one who wants to have more specific knowledge of them is invited to send to the Cornell Experiment Station for these bulletins.

Now, it is not wise to expect too much from any scheme like this. No doubt, there are hundreds of children who will plant the seeds and whose enthusiasm will then die out and they will be left as ignorant as they were before; but any child whose attention has been aroused by his parent or teacher in the manner suggested by the earlier leaflets of this series has his face set in the right direction for the formation of the habit of looking properly at things and drawing correct conclusions from what he sees. If in addition to this the child is asked to write out his observations and conclusions, and to make sketches of his plants at different stages of their growth, he has begun the study of nature in a way that will not only help his intellectual development, but will prove a source of comfort and pleasure to him all his life long. We assume that any child in New York state can have one of these leaflets if he chooses. Perhaps, by a stretch of generosity, the director of the station might send them to places outside of the state. This subject is one of great interest and we shall recur to it again. Meanwhile, we hope that any reader of GARDEN AND FOREST who can do so will persuade some boy or girl to try a little garden of these two plants, for there is an advantage in limiting the study to a few kinds only. A place four feet wide and twenty feet long is as large as most boys or girls will take care of. Half of the ground should be devoted to the Peas, the other half to the China Asters, and four or five distinct kinds in different colors will make enough variety. The leaflets, which can probably be had by addressing the Chief Clerk of the College of Agriculture at Ithaca, New York, give a few necessary directions at the outset, and some suggestions as to the proper line of study will be made later on.

Notes on the Pine Forests of Southern and Central Arizona.

MUCH of the forest area of Arizona is in the northern portion of the territory on the Colorado plateau, and our Pine forests reach their highest development in the vicinity of the San Francisco Mountains. From here they stretch northward to and beyond the Grand Cañon of the Colorado River, westward to Bill Williams Mountain, and southward to the rim where the Colorado plateau breaks down to the southern plains. This is what is generally known as the coniferous forest area of Arizona. In addition to this, Arizona has considerable timber in the south and central portions of the territory. The many mountain ranges south of the Colorado plateau, reaching an elevation of 7,000 feet, have more or less extended areas of cone-bearing trees. It is of these forests that I desire to speak.

The Bradshaw Mountains, Mogollon Mountains, Mazatzal Mountains and the White Mountains may be considered as southern extensions of the Colorado plateau. Of these mountains the Bradshaw Mountains are the most poorly supplied with Pine timber. The forest area of this range of mountains is mostly in the vicinity of Prescott, extending from here about twenty or twenty-five miles south and south-westward. The Mogollon Mountains and the Mazatzal Mountains are separated from the Bradshaw Mountains by the Verde Valley. Both of these ranges have wide strips of Pine along their summits. The White Mountains are well timbered with White and Yellow Pine, some of the most valuable Pine in the territory being on these mountains.

Immediately south of these are a number of lower ranges, namely, the Pinal, Superstition, Caluro and the Gila Mountains. All of these ranges have a narrow fringe of Pine along their summits, varying from a few yards to a half mile in width, and in places extending for some distance down the cañons.

In the south and south-eastern portions of the territory, south of the ranges mentioned, are a number of others with summits reaching to, or nearly to, the height of 10,000 feet. All of these mountains are well timbered above the altitude of 7,000 feet. Enumerating these ranges in their order, beginning in the very south-eastern part of the territory, we have the Chiricahua, the Huachuca, the Santa Rita, the Rincon and the Santa Catalina Mountains. The entire western and south-western portions of the territory have no high mountains and are therefore entirely destitute of cone-bearing trees. Between the high southern ranges are a number of lower ranges, namely, the Whetstone, the Dragoon, the Mule, the Tucson and the Pinaleno Mountains. These ranges are all destitute of Pine, or have very restricted areas of Nut Pines on their higher slopes.

Confining our attention to the area of Pine in Arizona south of the Colorado plateau, and not taking into consideration our three species of Nut Pine, I should place the areas in square miles as follows: The Bradshaw Mountains have about twenty-five square miles that might properly be termed forest. The forest area of these mountains is nowhere very dense and consists of narrow, broken stretches of Yellow Pine, *Pinus ponderosa scopulorum*, along the highest portions of the range. Below the area of Yellow Pine, at an elevation of about 6,000 feet, is a large belt of Nut Pine, *P. monophylla*, while farther down the mountains are thousands of acres covered with a scattered growth of the small Nut Pine, *P. edulis*.

The forest area of the Mazatzal Mountains may be placed at about seventy square miles. A dense strip of Yellow Pine extends southward from Baker's butte into this range of mountains. Growing with the Yellow Pine at the higher elevations are scattered specimens of White Pine, *Pinus flexilis*; Fir, *Abies concolor*; Douglas Spruce, *Pseudotsuga taxifolia*; while at lower elevations are large areas of Junipers and the two Nut Pines (*Pinus edulis* and *P. monophylla*). The Foxtail Pine, *P. Balfouriana*, var. *aristata*, does not seem to reach south of the San Francisco Mountains.

The Mogollon Mountains have some forty square miles of timber. This area is a continuation of the forests of the Colorado plateau and is very similar to the forests of the Mazatzal range.

The White Mountains are known to be well timbered, but I am unable to state the area of Pine forests upon them. Taking into consideration their area above 7,000 feet and the various species of Pine collected there, it is safe to estimate that at least a hundred square miles of these mountains are more or less thickly timbered with Pine. On the higher portions of this range are considerable areas of White Pine, *Pinus flexilis*, mixed with Fir and Spruce. Many of the cañons are lined with an excellent growth of Cypress, *Cupressus Arizona*. This tree is also found in the mountain ranges to the west. At the Natural Bridge it forms large forests almost to the exclusion of other trees.

The low mountains south of these four ranges, namely, the Pinal, the Superstition, the Galluro and the Gila ranges, altogether have not more than thirty-five square miles of what might properly be termed forest area. This area is almost entirely of Yellow Pine, and is represented by narrow fringes along the summits of the mountains and at the upper courses of the cañons. Much of these mountains, however, is covered with a scattered growth of Nut Pines, *Pinus edulis* and *P. cembroides*. In these low mountains the two species of Nut Pine above mentioned come together, one being a northern species and the other a southern. Below the Pines all these mountains of central Arizona are thickly covered with a dense growth of Scrub Oak, *Quercus undulata*.

The distribution of the Pine forests on the high mountains

of south and south-eastern Arizona is very interesting on account of the number of species represented and the varying preponderance of species on the different ranges. The forest area of the Chiricahua Mountains is about 150 square miles. This area extends almost continuously from the Mexican line to Apache Pass, a distance of about forty miles. I think it safe to estimate the average width of this forest belt to be nearly four miles. The Yellow Pine of the more northern mountains here gives place almost entirely to a form having longer and broader leaves. This Yellow Pine is the prevailing tree of the Chiricahua Mountains. The Arizona Pine, *Pinus Arizonica*, is abundant in many of the cañons, but nowhere forms a preponderance of the forest growth. The Chihuahuana Pine, *P. Chihuahuana*, a tree entirely unknown north of the Santa Catalina Mountains, is frequent at intermediate elevations between the Nut Pine, *P. cembroides*, and the Yellow Pines. On these mountains two species of White Pine come together, one, *P. flexilis*, being a northern species, while the other, *P. strobiformis*, is a southern species. The White Pines occur as scattered specimens or in groups of a dozen or more trees at the heads of the cañons and along the summit of the range. On no part of the mountains do they add materially to the forest growth. It is worthy of note that a number of groves of Arizona Cypress occur in the cañons on the western slope of this range.

The estimated forest area of the Huachuca Mountains is about thirty square miles. This is an irregular, broken area covering the slopes of the higher peaks and extending in places some distance down the cañons. Nowhere are the forests of these mountains as dense or valuable as those of the Chiricahua Mountains. A few restricted areas on the northern slopes are, however, fairly well timbered with the different species of Yellow Pine, namely, Yellow Pine, Southern Yellow Pine and the Arizona Pine. A scattered growth of Chihuahuana Pine is found on these mountains just below the Yellow Pines. A few scattered trees of White Pine, *Pinus flexilis*, are found in the higher cañons. But one species of Nut Pine, *P. cembroides*, is found in this range.

The Santa Rita Mountains have a forest area of about thirty-five or forty square miles, centering about the high peak known as Baldy. These forests are of a denser growth than those of the Huachuca Mountains, but the same species are common to the two ranges, and in the same relative proportions. In relation to forest growth these two ranges are more alike than any of the ranges of southern Arizona.

Probably twenty-five square miles would represent the entire forest area of the Rincon Mountains. The forests here are unusually uniform, and consist almost entirely of the Arizona Pine, *Pinus Arizonica*. It is interesting to note that the Yellow Pine, *P. ponderosa*, the prevailing tree on all the other ranges of southern Arizona, rarely occurs on these mountains. The Nut Pine, *P. cembroides*, is abundant, and the Chihuahuana Pine is not infrequent.

The Santa Catalina Mountains are very broken and irregular, the highest point, Mount Lemon, reaching the altitude of 10,100 feet. The area of timber on this range is in the neighborhood of fifty square miles. All the higher portions are more or less thickly covered with Pine, Fir and Spruce. On the northern slope of Mount Lemon are growing the largest specimens of Douglas Spruce I have observed in the territory. At this locality, in a number of places, this species is the prevailing tree, many of the specimens being from five to six feet in diameter. Yellow Pine, *Pinus ponderosa scopulorum*, is the prevailing Pine. In these irregular, broken mountains are found all the species of Pines known to occur in the mountains of southern Arizona, with the possible exception of the southern White Pine, *P. strobiformis*.

The forest area of Arizona south of the Colorado plateau is, in round numbers, about 600 square miles. The total area of Arizona south of this plateau is about 75,000 square miles. From this it would appear that the Pine forest area

of southern Arizona is considerably less than one per cent. of the entire area. If we include the forests of Mesquite and other deciduous trees along the watercourses and in the lower parts of the cañons the total forest area would, of course, be slightly larger.

University of Arizona, Tucson.

J. W. Toumey.

Foreign Correspondence.

London Letter.

PHAJUS COOKSONI.—This is generally accepted as one of the most valuable plants that we owe to the skill of the hybridist, but its merits were never so fully revealed as by the specimen exhibited last week by the raiser, Mr. N. Cookson, of Wylam, Northumberland; this was a large mass carrying numerous large, healthy leaves and eighteen strong erect spikes a yard high, each supporting numerous rose and brown-purple flowers. I find this plant becomes unhealthy if kept in a tropical temperature, whereas in the intermediate house it is quite happy.

ODONTOGLOSSUM CRISPUM LUCIANI.—A first-class certificate was awarded to a beautiful variety shown under this name by Monsieur Linden, Brussels; the flowers were nearly four inches across, broad in the segments, white, shaded with rose and heavily blotched with purple-brown. The plant shown was small and bore only one small spike; there is, therefore, every prospect of its proving a still more valuable acquisition when cultivation has put some strength into its pseudo-bulbs and spikes. Connoisseurs voted it of first quality.

EPICATTEYA MATUTINA.—This is a new hybrid obtained by Messrs. J. Veitch & Sons from *Epidendrum radicans* crossed with *Cattleya Bowringiana*, the latter being the mother parent. The stems and general character of the hybrid are much more like those of the *Epidendrum* than the *Cattleya*, and the flowers, which are about two inches across, are yellow, tinged with vermilion, while in the three-lobed red and yellow labellum there is still less evidence of the *Cattleya's* influence. Those who hold that prepotency is on the side of the female have strong evidence to the contrary in this hybrid.

CIRRHOPE TALUM ROBUSTUM is now flowering for the first time at Kew. It is a remarkable species, its leaves and flowers being much larger than those of any other species known, the former being about twelve inches by four inches and the latter four inches long, the width of the segments being correspondingly large; they are borne in umbellate clusters seven inches through, and they are yellowish green with a dark red oscillating lip. The species was first described by Mr. Rolfe in 1893 from a plant introduced from New Guinea. *C. graveolens*, Bailey, is a synonym.

AN ORCHID SOCIETY.—It is reported that Manchester Orchid fanciers are about to form a society in the interests of their cult and entirely independent of any other society. "An entrance fee of three guineas and an annual subscription of one guinea thereafter is suggested, but this and other matters are subject to approval of the meeting to be called at an early date. It is estimated that within a radius of thirty miles of Manchester the Orchid wealth of the country is centralized." If this society will limit its operations to such matters as the spread of a taste for Orchids, their cultural requirements, etc., nothing but good can come of it, but if it enters into rivalry with the Royal Horticultural Society and Kew with regard to nomenclature and certificates, it may prove more vexatious than useful.

LATHYRUS SPLENDENS.—In GARDEN AND FOREST, 1894, p. 274, I asked for more information about this Californian Pea, the "Pride of California." According to Mr. Orcutt, and on p. 294, I was told that it had not proved hardy in the northern states. Nor has it proved hardy or ever shown anything like comfort out-of-doors here, but about two years ago I planted a seedling in a bed of sandy soil in a low, airy greenhouse, and this has proved quite a success. It has thrown out hundreds of shoots with healthy pinnate leaves, and from all the strongest of them numbers of

flower-scapes are now developing. The first two racemes opened about a week ago and gave us a foretaste of what we are to expect about the middle of April. What a lovely plant it is! flowers like those of the Sweet Pea, but of the richest carmine-crimson which glows in sunshine. This is a first-rate plant for the greenhouse here; it is perennial, stands London fog and yields a large crop of richly colored flowers in early spring. A figure drawn from the Kew plant has been prepared for *The Botanical Magazine*.

HIBISCUS MUTABILIS.—The double-flowered variety of this *Hibiscus* is a worthy garden plant, which, however, is rarely seen in cultivation—in European gardens, at any rate. Mr. Cannell sent me some flowers of it a few days ago, describing it as a new Mallow, and by far the finest he had ever seen; they were three inches across, very double, and colored bright rose, flaked with white. Originally Chinese, the type has long been cultivated or become established in most parts of the tropics. The double-flowered form was first flowered in London about a hundred years ago, plants having been raised from seeds obtained from Jamaica, where it forms a tree fifteen to twenty feet high, with palmately lobed, green, hairy leaves four to six inches across; the flowers are borne singly on axillary peduncles, and they are white when first they open, changing to pink, and finally to deep red. There is a good figure of this double variety in Andrews' *Botanical Repository*, t. 228.

NARCISSUS, ELLEN WILLMOT.—This is a new variety or cross of the *Ajax* section which we owe to the skill of the Rev. G. H. Engleheart, of Andover, one of the most successful breeders of Daffodils. It has the form of *Madame de Graaf* or *Empress*, but is larger, and is remarkable for the width and shortness of its trumpet and its broad overlapping sepals and petals. The color of the trumpet is lemon-yellow, while the other parts are creamy white.

NARCISSUS, SOUTHERN STAR, is another new seedling from the same source. It is one of the *Poeticus* section, but the flowers are about four inches across, with broad overlapping segments of the purest white, and the shallow, spreading, eye-like cup is nearly an inch across, and colored bright orange-red, becoming paler toward the base.

TULIPA KAUFMANNIANA.—A first-class certificate was awarded to this plant last week, when it was shown in fine condition by Messrs. P. Barr & Sons, Covent Garden, and Messrs. Wallace, Colchester. It has a short stem, broad leaves and large erect flowers, the segments of which are oblong-obovate, forming a deep cup, their color yellow at the base, the upper portion white, suffused with rose-purple. It is reported that this species is being naturalized in the garden of Mr. L. de Rothschild at Leighton Buzzard, where it does well in the grass, and was in flower on March 23d. According to a correspondent in *The Gardeners' Chronicle*, it flowered outside in a garden in Salisbury on February 26th. For its introduction we are indebted to Mr. A. Regel, who found it in Turkestan some years ago. It appears to vary in the form and color of its flower-segments and also in its leaves, judging by the figure in Regel's *Gartenflora* and the plants shown by Messrs. Barr and Wallace. It belongs to Baker's *Eriobulbæ*, which has woolly outer bulb-coats and broad leaves. There is a hybrid between it and *Tulipa Greigii*, received by Herr Max Leichtlin a year or two ago.

London.

W. Watson.

A bulb is simply a large bud with close-packed, fleshy leaves or leaf-bases in which is stored an accumulation of starch, sugar and other concentrated plant food. As hibernating animals store up fatty matter before going to sleep for the winter so do bulbs store up surplus food and hide themselves under ground so as to go through cold and drought unharmed. Bulbous plants are developed in regions where there are sudden changes of temperature or of drought and moisture, and the great natural bulb fields of the world are found where it is very cold or very dry in winter, rainy and warm in spring, and blazing hot and dry in summer and autumn.—F. W. Burbidge, M. A.

Entomological.

An Enemy of *Narcissus* and *Amaryllis*.

IN *Merodon equestris*, the *Narcissus* Fly, we have one more addition to the numerous insects which have been introduced from the Old to the New World. Its first advent in the United States appears to have been many years ago, for Packard, in his *Guide to the Study of Insects*, published in 1869, states that the late F. G. Sanborn bred the flies from larvæ which were probably introduced by importers of Dutch bulbs. Since that time the pest does not seem to have become common in this country, at least it appears to have been rarely, if ever, noticed by economic entomologists, although gardeners may have had more experience with it than is generally known.

In the Agassiz Museum, at Cambridge, Massachusetts, there are larvæ of this pest and damaged bulbs of *Narcissus* which were received from a garden in Brookline, Massachusetts, in 1879. During the past year or two this same establishment has suffered more than usual damage from the ravages of the *Merodon*, which appears to have been present in more or less abundance every season since it was first noticed in the place nearly twenty years ago. At that time, besides various species and varieties of *Narcissus*, it was found to attack bulbs of *Vallota purpurea* and its varieties. Recently it has been found very destructive to many rare and beautiful *Hippeastrum* hybrids, formerly known under the generic name of *Amaryllis*, and it is probable that it will be found to attack other plants of the *Amaryllis* family, to which the *Narcissus* belongs. There does not appear to be any previous record that it has ever attacked anything except *Narcissus*. The pest has affected bulbs, both in the open air and in the greenhouse.

The damage is caused by stout brownish maggots which live within and devour the interior of the bulb, either entirely destroying its vitality or so weakening it that it fails to flower or gradually decays. These maggots when full grown vary in length from about half an inch or a little more when the body is in repose to about three-fourths of an inch when active and extended. The body is somewhat wrinkled, composed of eleven or twelve distinguishable segments, upon which are a few very minute hairs. The head is very small and armed with a blackish two-pronged hook used in scraping the bulb, and on the posterior or anal segment there is a conspicuous hard, shining, black double-tubed organ, and a little below each side of this is a short horn-like appendage. When fully grown the maggots usually leave the bulbs and enter the surrounding earth near its surface, or rarely remain in the remnants of the bulbs, and change to stout dark brown inert pupæ, about half an inch in length and retain some of the marks characteristic of the larvæ. From these pupæ flies emerge in the spring if the bulbs are out-of-doors, or during the winter if they are grown under glass. These flies are two-winged and bear considerable resemblance to the well-known bot-flies, or to the *Chrysanthemum* flies, *Eristalis tenax*, familiar on flowers in late summer and autumn. They might be mistaken for very small humble-bees, except for the fact that the latter have four wings, while the *Narcissus* fly has only two. These wings spread an inch or more from tip to tip and may be nearly clear or slightly smoky.

The body averages over half an inch in length and is sometimes nearly three-fourths of an inch long. The body-color is usually bluish-black, more or less densely covered with broad areas or bands of orange, yellow, brownish or blackish hairs. The color and proportions of these areas of colored hairs are so variable as to have caused the early entomologists to give *Merodon equestris* several other specific names, but it would not be profitable to consider these variations here. Most commonly the male has the fore part of the top of the thorax thickly covered with yellow-brown hair, a broad black band or saddle across the middle above the insertion of the wings, the posterior tip of the thorax and first two segments of the abdomen

covered with tawny colored hairs, and the remaining part of the abdomen with bright yellow-brown hair. A common type among the females has the thorax covered with bright ferruginous hairs, the fore and hinder parts of the abdomen covered with paler hair and with a black band across the middle portion. As in most flies, the eyes are very large, appearing to form the principal part of the head. They are black, and sparingly covered with microscopic brown hairs. In the males the eyes are near together, touching at one part; in the females they are well separated by a brown hair-covered ridge which broadens from the top toward the mouth parts. The legs are black or dark brown and more or less covered with black or gray or

cavity from which it only emerges when fully grown. Usually only one larva occurs in each bulb, but more may sometimes be found. It is not easy to detect infested bulbs until the maggots are nearly fully grown and the bulbs soften because of the ravages in the interior. Sometimes the entrance of the maggot may be detected by a minute brown streak showing where it entered between the scales at the top of the bulb.

Apparently, the first account of the Narcissus Fly is that given and figured by Réaumur in the fourth volume of his celebrated *Mémoires*, published in 1738. He there states that in November, several years previously, Bernard de Jussieu had given him a number of bulbs of Narcissus in which he found the larvæ, and from which he bred the flies. In 1792 Fabricius described it as *Syrphus equestris*, afterward placing it in the genus *Merodon*. On account of the variability of the insect it has received a number of synonyms, among which appear to be *Merodon flavicans*, *M. cinereus*, *M. Narcissi*, *M. ferrugineus*, *M. transversalis*, *M. constans*, *M. nobilis*, *M. tuberculatus* and *M. bulborum*.

The bulb growers of Holland have long known *Merodon equestris* as a serious foe to Narcissus-culture, and we have records of its presence in that country since before 1840. It is generally considered as having been introduced into Holland with bulbs from southern Europe, probably from Italy. Various accounts of its ravages appeared from time to time, and it was a frequent topic of discussion in meetings of Dutch bulb growers, who found it difficult to combat on account of its habits and little-known life-history. In *The Gardeners' Chronicle* for 1842 there is a figure and account of the insect by the late John Curtis, who wrote under the nom de plume of *Ruricola*, and this figure was reproduced in the same journal in 1877 and 1885. The same figure is given in Burbidge & Baker's monograph of the Narcissus, published in 1875. Among other important papers was one published by F. W. van Eeden, of Haarlem, in 1853, and one by A. C. Groenewegen, of Haarlem, in 1883. The latter advised watching for weak plants and those that failed to grow in spring, and their destruction if infested, and the searching for the chrysalids which might be found near the surface of the ground around the plants before they flowered.

In May, 1882, Mr. J. H. Krelage, the well-known bulb grower of Haarlem, sent specimens to Dr. J. Ritzema Bos, with the request to make a complete study of the pest, the results to be published at the expense of the association of bulb growers of which Mr. Krelage was president. The outcome was an elaborate paper, with two plates of figures, entitled "*La Mouche du Narcisse*," published in *Archives du Musée Teyler*, series 2, vol. ii., part 2, Haarlem, 1885, and published also in the Dutch language. In this exhaustive monograph the author gives the results of various experiments in attempts to find means to combat this insect. One, at first thought to be efficacious, was very simple, and consisted of the immersion of the bulbs in water for eight days before planting, this seeming to kill or drive out the larvæ. Further experiments, however, showed him that immersion could not be relied upon to kill the maggots, and this conclusion is verified by Mr. Krelage in the *Revue Horticole* for 1889, who states that the method most generally followed with success is Groenewegen's plan already referred to. If the spring is cold and wet when the flies are emerging from pupæ a large proportion of them may die without laying eggs, and so there are periods of comparative immunity, but after a few favorable seasons they again become abundant.

In Brookline, Narcissus-bulbs in a warm dry rockery have been found much more liable to destruction than those growing in low damp ground, and especially among grass. Also, *Hippeastrums* under warm dry cultivation have been found much more affected by the pest than those grown under cool and moist conditions. Among these beautiful and often high-priced flowers the *Merodon*

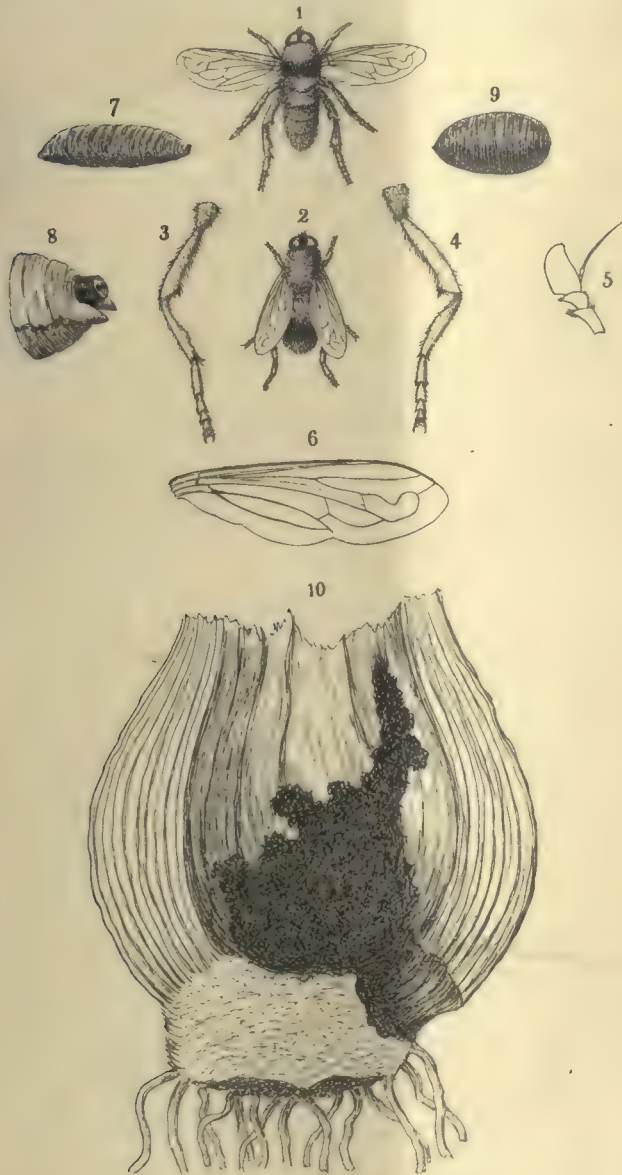


Fig. 18.—*Merodon equestris*, a Narcissus pest.—See page 154.

1. Male fly, natural size. 2. Female fly, natural size. 3. Posterior leg of male, enlarged. 4. Posterior leg of female, enlarged. 5. Antenna, enlarged. 6. Wing, enlarged. 7. Larva, natural size. 8. Anal segments of larva, enlarged. 9. Pupa, natural size. 10. Section of Amaryllis bulb, showing destructive work of larva and hole made for exit.

tawny-colored hair. The generic name of *Merodon* was given on account of a small tooth-like projection on the lower end of the femur of the posterior leg.

So far as known only one or two eggs are deposited at each plant, and the female appears to deposit them near the base of the leaves above ground in May or June, when the plants are out-of-doors. Upon hatching, the young larva is said to work its way into the bulb by burrowing between the scales, and once in its heart, it makes a large

equestris has proved itself capable of doing much damage, and cultivators should be on their guard against it.

The figures of *Merodon equestris*, on page 155, are from drawings by Mr. C. E. Faxon.
Jamaica Plain, Mass.

J. G. Jack.

Cultural Department.

Seasonable Notes.

AT this season every inch of available greenhouse bench and shelf room is in use, and it is difficult to find space for all the plants when potted or boxed. Every private establishment should have a number of cold frames, as they are preferable to greenhouses for growing many plants during the next few weeks, and the stock can be more readily hardened off and brought into good condition for planting outside.

Bedding plants at this season take up much space. Many flowering annuals are grown to use in the perennial borders and to grow for cut flowers. Our earliest Asters are now of good size in boxes in a cool frame. We usually plant these out about May 10th. Queen of Earlies and Comet are used for our first sowing, and we make successive sowings of these until the first week in July. Stocks, we find, do better grown in small pots; the possibility of breaking their roots when planting out is thus avoided. Zinnias are among the best annuals for cut flowers; while stiffer in appearance than Asters, they bloom continuously. Seedlings of these and various other annuals are now pricked off into boxes or frames. Geraniums were recently transferred to a cool frame from which Violets had been removed, and will be kept moderately close for a few days until warmer weather is assured. Coleus require strong heat, and a few sashes filled with warm stable manure and leaves provide a suitable place for these plants. Alternantheras root quickly and revel in such quarters. Carnations for summer blooming are now forming roots in three-inch pots in a cool frame. These will be planted out early in May. Winter-flowering Carnations in boxes can also be gradually hardened in a similar way. We look over the plants once a week and do any necessary stopping. Thus far there have been no signs of rust on our young stock.

Considerable space has recently been taken up with plants grown for use at Easter, and not a little judgment is necessary to bring them into flower at the right time, owing to the lateness of the season and vagaries of weather. We have this year tried a few Cape Cod grown bulbs of *Lilium candidum*; they are superior to the French bulbs we have usually grown, and there seems to be no reason why so many of these bulbs need be imported annually if they can be raised and sold at corresponding prices here. The sandy soil on Cape Cod and some other places is peculiarly suited to the growth of good clean bulbs of *L. candidum*. We plant out our forced stock after the flowers are cut, and if undisturbed for a few years and generously treated they give splendid spikes. *L. Harrisii* and *L. longiflorum* have shown a larger amount of diseased plants than ever before. Some commercial growers report that from fifty to seventy-five per cent. of their stock is diseased, thus entailing a serious loss. It seems imperative for large buyers of these bulbs to visit Bermuda during the flowering season, and see that those from whom they buy bulbs have clean stock. The disease undoubtedly comes in the dormant bulbs, and is not due to subsequent treatment. As soon as *Spiræas* (*Astilbes*) have finished blooming they are planted out in rich, rather moist, land, and make capital forcing clumps after being rested a year. The Crimson Rambler Rose has proved a decided acquisition as a flowering plant at this season. We grew a few plants from cuttings rooted late last spring, and flowered them in seven-inch pots, bending the shoots over in the form of a hoop. They all broke and flowered splendidly. This Rose is reliably hardy here, and survived outdoor treatment perfectly, while many hybrid Perpetuals were killed-back quite severely. We have some young plants now in two and a half inch pots, which will be grown along in pots for flowering next Easter.

Cannas continue to make rapid strides in popularity as is evidenced by the great numbers cultivated everywhere. But there is danger that they will become so common that popular fancy will turn to some other novelty. They are not sufficiently appreciated for winter flowering in pots. We have tried about twenty of the leading sorts this season, and the majority have been in flower since Christmas and are still loaded with spikes. Among the best varieties for pots are Queen Charlotte, Madame Crozy, F. Vaughan, Eldorado, Paul Bruant, Alphonse Bouvier, Gloire de Montet and General De

Mirabel. Our stock for bedding purposes are in four-inch pots, in a Carnation-house temperature. Tuberous Begonias are capital bedding plants for partially shaded locations, where they can be kept well watered. Our tubers were recently started in boxes of light sandy loam in a frame. Water needs to be given sparingly until they are well started into growth. Fibrous-rooted Begonias are beyond question among the very best winter-flowering plants, and no greenhouse is properly furnished unless it contains some of the leading sorts. We have just potted off a lot of these plants into small pots for flowering next winter, and there is still time to root and grow on good plants if cuttings have not yet been inserted. *B. Haageana erecta*, *B. semperflorens gigantea rosea*, *B. nivea* (a beautiful white variety) and Paul Bruant are among the most attractive sorts we have grown, but many more are beautiful. Of newer sorts we have two of the *Semperflorens* type which promise to be fine, Goliath and Mastodonte. The variety Gloire de Lorraine, already several times referred to in GARDEN AND FOREST, is sure to become popular.

Pelargoniums of the regal and show sections are now flowering profusely. It is surprising that so few private places grow these plants; a bench of them in bloom presents a striking appearance. They are mostly grown in six and eight inch pots and require plenty of water, frequent doses of liquid-manure and a light fumigation every ten days for green aphids. They like a partially shaded, cool, airy house. We find them useful for decorative purposes, and we drop a little floral gum in the centre of each flower to hold the petals together.

Now, when there is a pressure of work in all departments, the compost-heap is apt to be forgotten. Our Carnation compost was prepared last fall; it will be turned over shortly to give it a thorough mixing. We usually plant our Roses out in benches early in June, and have turned over the compost-heap for these recently and added some finely ground bone. If compost-heaps have not already been prepared they should be attended to at once.

Taunton, Mass.

W. N. Craig.]

Some Cool-house Shrubs.

WITH the arrival of spring we are again reminded of the wealth of good material in hard-wooded plants adapted for cool-house culture, and which have, in this country at least, been comparatively neglected in recent years. The plant-buying public becomes more discriminating each season, however, and a greatly increased demand for the few species of hard-wooded plants now offered for sale proves that interest in them is awakening.

The few Acacias now grown, mostly *A. pubescens*, *A. armata* and *A. Riceana*, deserve to be more generally known, and these three species form a good beginning for a collection of these charming plants. They are as easy to manage as *Azalea Indica*, the chief difference in treatment being that Acacias require rather more pruning to make shapely specimens.

Azaleas can be successfully flowered in a living-room without previous preparation in a greenhouse. After blooming the plants should be repotted, if necessary, and when the weather becomes warm, for example, about May 1st, the pots should be plunged out in the garden. They should be watered thoroughly every day during dry weather, brought in before frost in the fall and stored in a light, cool room. Those I have in mind were kept in a light attic where the temperature was probably just above freezing during cold weather. They should be brought into the warmer rooms of the house as their flowers are wanted. From plants thus treated by a neighbor a bountiful crop of flowers was produced, of good size and substance.

For several seasons past it has been shown by commercial growers that species of *Ericas* can be grown as well in this climate as in that of Europe, and while all species may not prove equally satisfactory, there are enough of free-growing ones to add greatly to the beauty and variety of the cool greenhouse at this season. Among the easiest to manage are *E. hyemalis*, *E. Wilmoreana*, *E. persoluta* in its various forms, *E. hybrida*, *E. melanthra* and *E. præstans*. These give a succession of bloom from late autumn to early spring. Outdoor culture is the most satisfactory for these plants during summer, providing they are given plenty of water in dry weather. There is less danger from red spiders under these conditions than when the plants are kept in the greenhouse.

The *Boronias* and *Eriostemons* are also welcome additions to the cool house in spring, and do not occupy much space before reaching the blooming size. While their flowers are not very large, those of the *Boronias* have the added merit of being fragrant. The brown-yellow flowers of *B. megastigma* in par-

ticular exhale an exceedingly agreeable fragrance. *Daphne Indica* is an old plant that has become rare in greenhouses, where it was plentiful twenty years ago, though less meritorious plants occupy its place. The best specimens of this plant that I have seen were planted out in a *Camellia* house, and received precisely the same treatment as the *Camellias*. As a pot-plant it is not always a success, as it is easily injured by careless watering during the winter.

The Indian *Rhododendrons* also deserve more attention. Some of the species and varieties are seldom out of flower. The white and pink varieties are among the most beautiful, and bear large flowers, many of them fragrant.

Rondeletia gratissima (also known as *Rogiera*) and *R. thyrsoidea* both deserve a place in the cool house, since they are easy to grow and quite free-blooming. These evergreen shrubs bear terminal or axillary trusses of flowers, as the *Ixoras* do. After flowering they should be cut back to keep them in shape, and potted in good loam, with free drainage. *Chorozema cordatum* should also be included in the available list. It is easy to manage and decidedly attractive when in flower. The long and graceful shoots are laden with pea-shaped flowers of orange and red, and give a cheerful touch of color to the house. This plant also should be pruned after the blooming season, and is seldom troubled by insects unless it is grown too warm, when it is liable to be attacked by red spider.

Holmesburg, Pa.

W. H. Taplin.

Erythronium grandiflorum and Related Species.

IN the *Botany of California*, published in 1880, *Erythronium giganteum* and *E. grandiflorum* were confused. Sereno Watson, in his *Revision of the American species of Erythronium* in 1891, corrected this mistake, but dealers and botanists had followed the older authority so long that it has been hard to overcome the error, and nearly all of the bulbs grown or sold by dealers as *E. grandiflorum* are really *E. giganteum*.

Erythronium giganteum is a strong-growing species, with the flowers one to sixteen in a raceme, and the leaves richly mottled in green and mahogany-brown. The flowers are straw-colored, with orange centre. The true *E. grandiflorum* has light green leaves entirely destitute of mottling, and its flower is oftener solitary. In its different forms *E. grandiflorum* has the widest distribution of any western species. It is found in the higher Cascades in Oregon and Washington, and in the Blue Mountains of eastern Oregon, in the Pine forests of eastern Washington, in northern Idaho and thence east to the Rockies and along that range to Colorado.

I know of three forms of this species. In the higher Cascades of Oregon and Washington there is an alpine form with light yellow flowers. It was this form and *Erythronium montanum* which were so beautifully represented in the recent illustration in GARDEN AND FOREST (see vol. ix., p. 504). In the Blue Mountains in eastern Oregon is found a bright yellow form, the only really yellow *Erythronium*. In the Pine woods of eastern Washington there is a form with pure white flowers with greenish yellow centres. In this the flowers are very large, and the narrow segments are closely recurved.

Erythronium montanum, an alpine species of the higher peaks of the Cascades, also has unmottled leaves and pure white flowers with yellow centres. In this the leaves are rounded at the base, a character which readily distinguishes it. In its high mountain home the seasons are very short, and it is wonderful how soon after the snow has melted its beautiful flowers will expand, and how much cold and what hard conditions such frail-appearing creations will endure.

In the Sierra Nevada, from the north to Tulare County, there is another species with unmottled leaves growing in high altitudes. In this the leaves are a dark purplish green, and the flowers borne in a crowded raceme. The flowers are white, with an orange centre, and are suffused with and soon turn pinkish purple. This species I have identified as *Erythronium purpurascens*, although Mr. Watson described the latter as having mottled leaves.

These three species then are the only western Dog's-tooth Violets with unmottled leaves, and, although varying considerably in style, stamens, etc., are very much alike in habit and growth. As garden plants they are not nearly as satisfactory at Ukiah as the mottle-leaved species, perhaps because I have not yet given them just the right position and shade. The trouble is that they flower too soon after they come through the ground and have no length of stem. I have tried giving extra shade, with some improvement, but think I will have to find a colder position for them. There is no trouble with any other species in that regard. Again, I found that

Erythronium montanum, following the habit in its mountain home, does not come up till after it becomes too warm here for its proper flowering. I have the same fault to find with *E. purpurascens* from high altitudes, although the same species from a lower altitude is now (April 1st) in flower.

What is a fault here might prove to be a recommendation in the colder climate of the eastern states or northern Europe, and I am inclined to think that the true *Erythronium grandiflorum* in its various forms would do splendidly there.

Ukiah, Calif.

Carl Purdy.

Lilium Harrisii and the Electric Light.

AT a recent meeting of the Horticulturists' Club of Cornell University, M. G. Kains presented notes of experiments with the Easter Lily. As to the effects of the electric light in its cultivation, he said that the bulbs were potted the middle of October, plunged in a solid bed late in December, and the electric light turned on January 1st. A globeless arc lamp was used. It burned from 5 P. M. until 6 A. M. for the following four months. The bed was divided into three sections. The first was exposed to the full glare of the naked light; in the second, the light passed through a large pane of glass which cut out some of the ultra violet rays, but did not impede the passage of the light; the third section was separated from the light by a black canvas curtain, which was drawn across the bed each night before the lamp was lighted. When the light was first turned on, the plants were of uniform development, but in six weeks changes appeared in the foliage, which gradually became more pronounced. The plants in the lighted sections grew very tall and spindling, had long peduncles, narrow and fallow green, very much curved leaves far apart on the stems. These effects were most apparent under the naked light. The plants in the unlighted section were more robust; had deep, glossy green leaves, were more stocky, less subject to disease, and, on the whole, more evenly developed. After the buds were formed these differences did not become more pronounced, but the buds under the naked light soon began to show a dark brown streak on the surface most exposed to the direct rays from the lamp, and this burn increased as the buds grew and expanded into blossoms. The seared petals were much more curled than is ordinarily the case with healthy blossoms, and the stripes of brown were in some cases a quarter of an inch wide on each of three petals. No such trouble was experienced with the plants in the light which had passed through the pane of glass. The earliest flowers appeared on plants in the naked light, and in this section they lasted on the average nine days. Four days later the plants in section two flowered, and lasted here nine and a half days. The plants in the unlighted section were nine days later than those in section two in coming into blossom, but the flowers, though slightly smaller, lasted eleven days and were more robust. The flowers in the lighted sections, like the plants which bore them, were spindling, but not unsightly, excepting those which were burned.

A plant with two remarkably evenly developed stems was taken from the unlighted section, and so placed that the curtain could be drawn between them, the one stem being in the unlighted section, the other among the plants behind the pane of glass in section two. A second twin-stemmed plant was also taken from the unlighted plot and placed in the naked light, but the larger of the two stems was covered each night with a tube of manilla paper to exclude the light entirely. In each case the stem in the light blossomed a day before the other stem. Some other plants of uniform development were marked, and a part of them removed to the lighted sections, the others being left in section three. The former bloomed seven days before the latter, the last blossom in the former group being three days earlier than the first blossom in the latter group. The blossoms were perfectly healthy and lasted as long as those in the unlighted section. From these experiments it is concluded that it will probably pay commercially to use electric light in cultivating *Lilium Harrisii* when the buds are an inch long, in order to hasten their expansion, and that the light must pass through glass to avoid burning the petals.

Cornell University.

S.

Sternbergia Fischeriana.—This is a spring-flowering species of the well-known Winter Daffodil, and as it now appears in the border is a noticeable flower, even though it comes in Narcissus time, when yellow flowers are becoming plentiful. *Sternbergia Fischeriana* differs from the fall-flowering *S. lutea* in having much broader leaves, smaller flowers of the same rich yellow color. The peduncles are short and the flowers are borne above the leaves, which as yet are only slightly de-

veloped in height. The plant flowers freely, each bulb producing several blooms. The Sternbergias are all valuable bulbous plants in any garden and are perfectly hardy, even the leaves of *S. lutea*, which are in evidence all the winter, and only ripen at this season, being unaffected by the rigors. That they are not more grown is probably owing to their need of a special position in the border, which they do not always find. As *S. lutea* now ripens it requires a position where it will be fairly dry, and a warm place where it will be well roasted in summer. In such a position, in rather heavy soil, it has never disappointed me; and it starts in due time in the late fall and blossoms profusely, and even multiplies. The large-flowered *S. macrantha*, which follows this species in flower, evidently requires the same kind of location, for several clumps planted in other conditions here have as yet failed to do much in the way of flowering, though the leaves are now prominent enough.

Elizabeth, N. J.

J. N. G.

Carnations.—These plants were never finer than they now are in the houses of William Nicholson, at Framingham, Massachusetts. Eldorado is perfection here and unique in its class. It is a fragrant picotee with yellow ground and red-edged petals. The demand for fancy striped varieties is very properly increasing every year. Della Fox has not given entire satisfaction. It was expected to supersede Daybreak, but there seems to be room for both of them, and especially for Daybreak as it is grown by Mr. Nicholson, and Mr. Tailby, of Wellesley, has Della Fox at its best, and this is remarkably good. Hector, where it succeeds, is a superb variety, but florists about Boston are looking for a better scarlet than Portia. A very high opinion is given of Tailby's new scarlet. As seen with him it does not appear to have a fault. In strength of stem and size and shape of bloom it is Daybreak in every particular except color, while it is better in constitution and fully as free. Jahn's scarlet has first-rate points, but it fades quickly, and the same may be said of Nicholson's Camp Fire, which has proved a splendid summer bloomer.

Calla Elliottiana.—Mr. Watson's reference to the yellow *Callas* reminds me that I saw just one hundred seedlings a few days ago at Mr. Tailby's, all from one head of seed; 104 seeds germinated and four plants died. From the three original plants raised two years ago Mr. Tailby has raised twenty by offsets and division. Dividing is hazardous, and one fine plant was lost through this method. That they need some moisture during the winter and tolerable warmth is the experience on this side. Hybridizing with our common *Arums* has been tried, and also with the Little Gem *Calla*, but evidently without advantage. What seems the most likely and possible cross will be tried this season with *Richardia alba maculata*, a species in appearance very similar to *C. Elliottiana*.

Wellesley, Mass.

T. D. Hatfield.

Correspondence.

Notes from Cornell University.

To the Editor of GARDEN AND FOREST:

Sir,—A number of interesting things are now going forward in the Horticultural Department at Cornell University. Perhaps the most unique venture is the plan to grow this year all the kinds of annual flowers. These plants have been given very little systematic study in this country, and their botanical classification and direction of evolution are very little understood. An excellent piece of land has been set aside for the test, and all the tender species have already been sown in flats in the forcing-houses. The greater part of the kinds, however, will be sown directly in the field. J. M. Thorburn & Co. have supplied over 800 kinds of flowers to this test, and it is the desire of Professor Bailey to receive seeds of any varieties of annual flowers which seedsmen or others may wish to have tested.

The *Dahlia* test is to be continued this year. An excellent plot of ground is available for this purpose. Seeds and tubers of a number of the wild species have been received from Mexico, and these are already growing under glass. It is not expected that this *Dahlia* test is to comprise all the varieties now on the market, but it is probable that over 500 kinds will be grown. The American *Dahlia* Society will send a committee to inspect the plantation this year.

Just at present a fine collection of *Geraniums* is in bloom in one of the houses. About 430 varieties are in flower, distributed among the various groups, as Bedding *Geraniums*, Ivy-leaved *Geraniums*, Show and Tricolor *Pelargoniums*, Rose *Geraniums* and the like. Professor Bailey is taking great

interest in *Pelargoniums* just now because the group is a most fertile one in which to study many problems connected with the evolution of plants. He is in correspondence with persons at the Cape of Good Hope, whence he hopes to secure some of the wild types, and he will look up the subject abroad during the present summer.

A very large collection of *Ixias* is just now passing out of bloom. Over fifty varieties of *Mignonette* are now in full glory, and a number of experiments are going forward respecting the influence of certain conditions upon fragrance.

The second crop of *Strawberries* is now passing. The first crop was off about a month ago. The larger part of a house, twenty by thirty feet, has been devoted to the *Strawberry*, and the most satisfactory results have been secured. The first crop averaged six to eight perfect berries to the pot, and the first quart sold (early in March) for \$2.00. So far, the Beder Wood has given the best results, although the color is too light for an attractive berry. Van Deman is now in crop, but, although a perfect flower, it seems to need extra care in pollination. The handsomest berry in the house is the Hunn, but its lateness debars it from winter cultivation.

An extra effort is being made to determine the causes of unsatisfactory results in the growing of *Mushrooms*. In order to study the question under the best conditions an ideal house was built last summer, with stone sides and iron roof, with an inside space of about thirteen by eighty-two feet. Something like a dozen methods of growing *Mushrooms* have been tried during the winter. Some of them have resulted in entire failure, and others have given excellent results. One of the curious things in connection with the experiment is the fact that the wettest beds—even those which are almost soaking wet—have, so far, given the best results, although this seems to be contrary to general experience.

Ithaca, N. Y.

A. B. C.

An Orchid Scale, *Aspidiotus biformis*.

To the Editor of GARDEN AND FOREST:

Sir,—The scale which I described as *Aspidiotus biformis* was discovered on June 9th, 1892, on a plant of *Cattleya Bowringiana* at Hope Gardens, Jamaica. On July 7th of the same year I found it again on an Orchid at the Kingston (Jamaica) Flower Show. In December, 1892, Dr. Henderson found a variety of the same scale on *Odontoglossum grande* at Kingston, Jamaica. In the meanwhile Mr. Hart had detected it in the Royal Botanic Gardens, Trinidad, on *Oncidium sprucei*; later he found it also on *Epidendrum*. Occurring thus on several genera of cultivated Orchids, I had expected that the scale would before long be brought to the United States, though no specimens had yet been seen except from the West Indies. This expectation has now been realized, but, fortunately, the scale has been prevented from landing by Mr. Craw, who found it on a vessel from Central America arriving with Orchids at San Francisco. The specimens have been transmitted to me, but the exact locality where the Orchids were obtained is unknown, nor do I know the species of Orchid.

The female scale is small and round, nearly flat, of a reddish brown color, quite dark; the male scales are very small and inconspicuous, elongate in form. By the shape of the male scales, especially, the insect is readily distinguished from *Aspidiotus ficus*, which it somewhat resembles. The microscopical characters are very distinct; the lobes are very distinct, and in the Central American specimens I find four groups of ventral glands, rather scattered, four or five glands in a group. The margin cephalad of the third lobe presents three low minutely crenate elevations, after which comes a conspicuous notch, and beyond this are more minute crenations.

It is very probable, of course, that this scale will gain access to some of our hot-houses, where it may become troublesome on choice Orchids.

Mesilla, N. M.

T. D. A. Cockerell.

Plants at Wellesley.

To the Editor of GARDEN AND FOREST:

Sir,—The greenhouses on the place of H. H. Hunnewell, at Wellesley, Massachusetts, are just now especially interesting for plants which are intended for summer decoration. *Pelargoniums*, Show *Geraniums*, *Fuchsias*, *Roses*, *Spiræas*, *Astilbes*, Indian *Azaleas* and many other plants in pots are pushing vigorously forward.

Cytisus Andreanus in bloom is especially beautiful; the large yellow flowers, with reddish brown standards, are very showy. It must be a splendid plant for shrubbery borders where it is hardy, as, for example, in our southern states or in California, where it ought to flourish. A bush of the European

Gorse, *Ulex Europæus*, an allied plant, is not to be despised. It at least reminds Old World gardeners of home. A few *Imantophyllums* remain in bloom. One of the best is from a set of seedlings sent here for trial by Messrs. Veitch, of London. It is much superior in size and color to the type. A well-flowered bush of *Franciscea confertifolia*, with salver-shaped flowers of light and dark blue, is very attractive. It is an interesting specimen, and one of the good old plants of which, in this age of commercial rotation, we see fewer every year. *Gloneria* (*Psychotria*) *jasminoides* is another of these. It is a bush of slow growth, and this specimen is about six feet high and probably twenty years old. It belongs to the *Rubiaceæ*, and its opposite leaves and umbellate arrangement of narrow-tubed four-lobed corollas remind one of the more common *Ixoras* which belong to the same order. A grand specimen of *Lomaria gibba* has just furnished itself with a new set of fronds—the second set this winter. It has a clear stem three feet long and a spread of six feet—a specimen such as one seldom sees. Here, too, is an extensive collection of hybrid *Hippeastrums*, new and old, and some of them are carrying gorgeous flowers. *H. vittatum*, though one of the oldest, is among the best. *Olympia* has blooms of orange-red seven inches in diameter, and *H. Mastersi*, though small, is free-flowering, with early deep red blooms. I have a batch of seedlings from a cross between *H. Johnsoni* and *H. Mastersi*, and although *H. Johnsoni* is the seed parent the majority of the seedlings, as far as they have flowered, show a decided leaning toward the pollen parent. As *H. Mastersi* is earlier than *H. Johnsoni*, does this account for the preponderance of the former among the seedlings which first show flower?

Wellesley, Mass.

T. D. Hatfield.

Notes from Germantown.

To the Editor of GARDEN AND FOREST:

Sir,—Our early-flowering shrubs have done uncommonly well this spring. Such plants as *Jasminum nudiflorum* and *Lonicera fragrantissima* were very full of flowers, and none of the buds were injured by cold. *Chimonanthus fragrans* flowered in a desultory way with us, beginning with a few blossoms in February, then came others in March, and I notice a few opening to-day, as late as the 15th of April. I am told that the flowers of *Chimonanthus* expand about Mobile in January, and that it bears seed there freely. Next to the three shrubs mentioned, *Daphne Mezereum* flowered, a much-neglected plant and hardly several degrees north of this latitude; then followed *Cornus mas*, an excellent shrub because it continues in flower a long time, and as I write, on the 15th of April, the flowers are still opening rapidly. Besides this, it is beautiful in fruit and foliage. *Prunus Davidiana* followed the *Cornus* closely; *Forsythia suspensa* is now in full display a little in advance of the variety known as *viridissima*, and with larger and lighter-colored flowers. Our native Spice-wood is in full bloom; *Magnolia stellata* is in its prime, and the flowers of *M. Kobus* are beginning to open a little in advance of those of *M. conspicua*, which is itself a day ahead of *M. Soulangeana*.

I have rarely seen our Swamp Maples so beautiful as they are now. Some of them are a perfect mass of brilliant red flowers. There is a great difference in the color of the flowers on individual trees, and this point ought to be considered in propagating varieties. The flowers are dropping from the Elms and Soft Maples, and as no frosts have occurred since they opened, we shall undoubtedly have an abundance of seed.

Germantown, Pa.

Joseph Meehan.

Recent Publications.

Diseases of Plants Induced by Cryptogamic Parasites. By Karl Freiherr von Tubeuf, translated by William G. Smith. Pp. xv., 598, 8vo. with 330 figures. Longmans, Green & Co., London and New York.

This treatise is one of the best general works on fungi which cause diseases of plants which have yet been published. The original German edition appeared only in 1895, and it is unusual for an English translation of so large a book to be prepared in so short a time. This is, perhaps, due to the fact that Dr. Smith, the translator, was at one time a pupil of Dr. von Tubeuf, and was on that account the better able to present his views to the English-speaking public. The translation follows the original closely in most respects, but in some cases, as in the accounts of the genera *Exoascus* and *Gymnosporangium*, the subject has been revised and extended by the author so

as to embody the results of recent investigations. In form the treatise is encyclopædic, a general enumeration and description of all the principal parasitic fungi which are of interest to the vegetable pathologist being prefaced by short chapters on the nature of parasitism, the effects of fungi on their hosts, their relation to the substratum, and similar topics on which the non-professional reader needs information before proceeding to the consideration of special fungi. There is also a short account of preventive and combative measures, and two chapters on symbiosis. The author has shown good judgment in his management of these topics, and, although brief, is clear, and he has avoided entering upon lengthy discussions of questions on which authorities differ.

By far the larger part of the book is devoted to descriptions of different species of parasitic fungi, including not only European fungi, but many species from North America and other parts of the world. The author has summarized the very large number of papers relating to fungi which cause diseases of plants which have appeared in recent years, and few books on a subject in which new facts are brought out monthly, and almost daily, have the appearance of being so well up to date as the present work. The fungi are arranged by their orders, beginning with the lower, and under each order are given the more important genera and species pathologically considered. Then follow chapters on pathogenic slime-fungi, bacteria and algæ. The pathogenic bacteria are very summarily treated, but the plan of the author evidently did not require a full treatment of these forms, which, at the present day, are usually relegated to special treatises. At the end are a very convenient index of parasites and an index of host-plants. We know no book on the subject which presents so attractive an appearance. The text is unusually clear and well arranged. The numerous figures are, in nearly all cases, well executed. Those taken from other works are well selected and do not have the time-worn look often found in treatises on this subject, and there are also many original and characteristic habit-pictures. The figures in the translation, however, are not so well executed as those in the German edition. In short, the book is one which should be in the working library of all students of economic fungi.

As a supplement to the manual entitled *Vegetables under Glass*, Mr. Henry Dreer has just issued a similar work on *Vegetables Grown in the Open Air*. The plants are grouped according to their botanical affinities, an arrangement which has many advantages, but which we have never before seen followed in a manual of this sort. This study of plants which are botanically related affords an opportunity to give certain descriptions of the general characteristics and cultural requirements of the entire group, and the specific differences can be explained in connection with the general resemblance which they bear to each other. The subjects of drainage and fertilizing, irrigation, spraying and storing the crops are treated in a practical way, and the cultural details contain abundant quotations from practical growers upon specific points. Altogether, it is a good little book, and the same may be said of *Grasses and Clovers*, another one of this series which is generally known as Dreer's Library. This is a little handbook on forage crops, with a chapter on lawn-making and lawn management. We have been trampling grasses under our feet all our lives, and yet perhaps there are few plants about which we really know so little. This little treatise will be found useful to any one who is beginning the study of this interesting family. But besides the Grasses, leguminous crops are made the subject of a discriminating essay, and farmers everywhere are urged to experiment with the Cow Peas, the Clovers, Vetches, Tares, Beans and other plants of this family on account of their special power of transferring the free nitrogen of the air to the soil and thereby enriching it with the most expensive element of plant-food. These manuals cost only twenty-five cents each.

Notes.

Magnolia stellata was in full flower in the vicinity of this city on the 15th of April. The fine specimen which we figured on page 195 of vol. ix. was a mound of snowy bloom more than twelve feet in diameter.

Two little girls near Croydon, England, recently died of acute inflammation of the stomach brought on by eating young growths of the common Privet. Children should be cautioned against eating the leaves or fruit of any plant with which they are not familiar.

Pots of fruiting Strawberry-plants were an attractive Easter specialty in a fruiterer's window on Broadway last week. The foliage was fresh and luxuriant, with three or four large highly colored ripe berries and a few immature ones. The plants sold for \$1.50 to \$2.50 each.

The white form of *Chionodoxa Lucilæ* seems to grow as strongly as the type, and makes a grateful contrast with it. The white form of *C. gigantea* is rare, but it is a sturdy and desirable plant, and we may hope that within a reasonable time white *Chionodoxas* of all the species will be comparatively abundant.

Several large growers of Lilies for the Easter market make complaint in the *American Florist* that the bulbs of *Lilium Harrisii* which are grown in Bermuda are proving generally diseased. They all agree that these bulbs could be satisfactorily grown in our southern states, the only trouble being that Americans are disinclined to wait for profits. It would require two years at least before any crop could be marketed.

The first tree with conspicuous blossoms to flower this year in the Arnold Arboretum was the north China Peach, *Prunus Davidiana*, which was fully out ten days ago and has been extraordinarily beautiful. This tree is perfectly hardy, but the flowers are often killed by frost after the buds begin to swell, and during the ten or twelve years that it has inhabited the Arboretum it has only once or twice before flowered as profusely as it has this spring, and although producing more or less flowers every season it has not borne fruit yet in the Arboretum. *P. Davidiana* ought to be better known as an ornamental tree, as it flowers before any of its kind, and the pale pink petals, although not as large as those of some forms of the cultivated Peach, are exceedingly attractive.

Maple wood has a distinct and positive value for flooring which no other hardwood which is workable possesses. Its hardness and smoothness give it power to endure the severest wear; it has a light and attractive color, and it can be cleaned as easily as Maple. It has hitherto been abundant enough to meet the growing demand in every part of the continent and the requirements of the large export trade. Nevertheless, since only a part of the tree is utilized, the waste of the lumber is great, and the best hard maple, which is found in the lower Michigan peninsula and in Wisconsin, is disappearing more rapidly than even the Pine did, because, as a rule, good Maple land is good farming land. The time seems to be coming when the supply will be depleted, and the *Northwestern Lumberman* is, no doubt, right when it complains of the reckless competition under which this valuable product is sacrificed.

Different species of *Swainsonia*, particularly *S. Greyana* and *S. galegifolia*, which is largely grown for cut flowers in this country now, are plants which are greatly dreaded by the stock growers in Australia. Chemical analysis does not show any toxic principle in the plants, and yet when sheep and other animals eat them they acquire a habit for them and will eat nothing else, their brains seem to become affected, they never fatten, and finally die. Sheep addicted to this habit are known as "Indigo eaters," and they separate from the flocks and wander about listlessly. A case is recorded where horses hobbled for the night at a place where *Swainsonia* was growing were difficult to catch the following morning, their eyes were staring out of their heads, and they pranced about against trees and stumps. Two out of nine died the second day after, and five others had to be left in the camp, for when driven they would suddenly stop, turn round and round for a time, then fall down, rise again and repeat the performance. No experiments as yet give any reason for the complicated effects which this forage has on stock, but there certainly is much testimony to the fact that it causes a sort of madness which induces creatures who feed upon it to attempt to climb trees or commit other eccentricities. Baron Mueller believed that *Swainsonia* possesses the deleterious properties attributed to it, and he publishes this view in the *Transactions of the Royal Society of Victoria*.

Fresh figs are hardly known in northern markets because the fruit is so perishable. They ripen when the weather is hottest and can be handled only by experienced persons. It is costly work, too, to prepare the fruit for distant marketing. The trees need to be picked over carefully every day, and this involves much labor; rainy weather occasions loss by packing, and the acrid juice of immature figs eats into the fingers of the pickers and packers. It is necessary to pick them while still firm, which is a misfortune, for although they become quite edible when soft they lack the fine quality of tree-ripened fruit. In their best condition they will hardly keep thirty-six hours at ordinary temperatures, but, of course, they can be kept much longer in a cold temperature, so that with rapid refrigerator transportation the shipment of figs from the south might become a business of importance. Next to fresh figs canned figs are the best, and there is no reason, except for the larger quantity of sugar required, why figs should not be grown and canned as cheaply as peaches. The figs are sometimes peeled before canning, and this is supposed to increase the delicacy of their flavor. Usually, however, they are cooked unpeeled and with the stems on as they come from the tree, as they hold their shape better when treated in this way. Canned figs, however, are not common in our markets and their price is high. And yet the factories at Biloxi, Mississippi, and New Orleans at one time put large quantities of canned figs on the market, for the demand was very active up to the panic of 1893, and the canners paid as high as four cents a pound for the fresh fruit and could not get enough to fill orders. Each factory has its own method of canning, and the process usually takes two days. In the finished product the fig holds its shape perfectly but becomes partially transparent, and as the final syrup is clear and free from sediment it is very attractive. All this information is found in a bulletin on Fig Culture just issued by the Division of Pomology of the United States Department of Agriculture, where many interesting facts about the cultivation and curing of figs in California and in the Gulf states are set forth.

The trade in plants for Easter was a very active one this year, and immense quantities of many kinds were sold for home and church decoration. Lilies and Azaleas were, as usual, the favorites, and most abundant, though in the displays made by florists Lilies were not so prominently shown as many other plants which are less popular, and therefore need to be brought to notice. Hydrangeas sold slowly, and one of the most extensive dealers declared that half the Easter stock of these plants remained on the hands of the growers, and the other half which had been sold to the retailers was left on their hands. These plants require more water than they generally receive in households, and so last but a short time and have lost favor. Japan Maples, with bright variegated foliage and trimmed back into small plants, were observed in one collection, and other plants seen in one or other of the best stores were Anthuriums, pink Bouvardias, Kalmias and Otaheite Oranges. The delicately flowered *Spiræa Thunbergii* was noted, but hardy shrubs forced into flower were comparatively rare. Occasional neat little plants of the Australian *Boronia heterophylla* were distinct and bright, with small bell-like carmine flowers. Marguerites were plentiful, as were Ericas, with Lilacs and Cytisus in smaller supply, and but few Cinerarias. There were the usual spring bulbous-flowering plants and attractive pots of Violets, with the cheaper Vincas in flower, and in some of the most costly collections were pots of stockily grown General Grant Geraniums, which, on account of the approaching memorial celebration of the dedication of the Grant monument, were in special demand. Candytuft, Stocks and other herbaceous plants were not unusual, and pots of floriferous Begonias were delicate and pleasing among more bold and conspicuous offerings. One or two of the windows exhibited extravagant arrangements of plants in crêpe paper and broad ribbons, and of large boxes of fanciful colors, and in these same stores some of the plants were veiled in fine silk net. But this attempt at adornment was exceptional, and most of the plants in pots were shown on their own merits, and without any artificial disfigurement. There were some simple and pleasing arrangements of plants in round and oblong baskets, the latter of plainly woven fibre, generally green. Lily-of-the-valley, edged with Violets, and white Hyacinths and Violets, bordered with *Tradescantia*, were two of these simple and natural plantings. A larger basket held tall plants of Lilies, Heather and a few heads of Hyacinths, well grouped and singularly attractive. In another basket nearly a dozen dense and airy heads of *Spiræa* compacta rose in the centre above two colors of Heather and a cluster of several shades of pink Hyacinths, while well-grown Ferns gave a flourishing and established air to the whole.

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The Field of Landscape-art.

WE are constantly asked whether the profession of landscape-gardening offers a promising field for young men who are looking for some calling in life which will be useful and remunerative. We have always felt obliged to reply that there is comparatively small demand for the counsel of landscape-gardeners in this country, and we have added that until the true functions of these artists are more thoroughly recognized the call for their professional services will be limited. Most of the men who make inquiries on this point have themselves hazy notions as to what the legitimate field of a landscape-gardener is. The prevalent idea is that his work is chiefly ornamental and that his province is to do about the same thing for the surroundings of a house that the decorative artist does for its interior when he selects the furniture, rugs and hangings and decides upon color-schemes and the like. That is, after an architect has built a house, it is considered proper to call in a landscape-gardener to plant some ornamental trees and shrubs about it and lay out paths and flower-beds in order to beautify the grounds. Now, it is true that the landscape-gardener, like any other artist, has to deal with beauty, but his first and fundamental study is to provide for human use, for comfort and for convenience. An architect of taste does not make a building and then hang ornaments upon it without and within. His structures will be beautiful, but this beauty is developed out of the design so as to be an essential part of it, and this is so profoundly true that the best architectural work will be beautiful primarily because it serves the purpose for which it was created. The same rule should hold in regard to the development of the grounds about a house. These should be primarily laid out for use and convenience, and their beauty should grow out of their perfect adaptation to the wants of those who are to use them. In short, as we have said a great many times, the house and grounds should be planned together, so as to make one picture; but even beyond this they should have a unity of design which is more than superficial. In fact, the beauty of the scene, which includes both the house and the grounds, should grow up from the general design and framework of the house and grounds as a place where all the

varied necessities of the family in the way of health and happiness and home life are the first things considered. This is the reason why no ready-made house-plan is adapted to all sorts of ground and why any ready-made planting plan is not available for use with all sorts of houses.

The most hopeful symptom we know is that architects are inquiring more and more for competent designers in landscape to assist them. That is, they feel the need of advice from some one who is trained to the planning and modeling of ground, one who is skilled to see at once all the possibilities that lie in any situation, not only for appearance but for use; one who knows how to take advantage of any diversities of surface or differences of outlook so as to make them available for varied purposes. Such a man can be of assistance to an architect not only in locating the house in such a way that it will appear to the best advantage, but also for placing it where the principal rooms will have a pleasing outlook. He will contrive facilities for access to it and agreeable lines of approach. The arrangement of different parts of the grounds for special uses requires thought and experience which are outside of the ordinary lines of the architect's study, and therefore the best architects have learned that the highest service which a landscape-gardener can render is precisely at the point where the essentials of the combined design of house and grounds are being considered.

All this means that a landscape-gardener ought to be much more than a mere decorative planter. The successful designing of public parks or of private grounds for daily occupation means first of all the study of human wants—the necessities of men and women and children of various circumstances and conditions. A good artist must be primarily a man of sound judgment and he should have a cultivated mind, wide sympathies and catholic tastes. Reading and travel and scholarship can do for the designer in landscape all that they can accomplish for the architect. A man may be able to mass a shrubbery effectively or arrange a border of herbaceous plants with skill and yet not have a particle of that profounder art which was seen in the grouping of the great buildings at the Columbian Exposition, and the planning of that Court of Honor which was the crowning artistic success of Mr. Olmsted's life. This view of the case contemplates an ideal that is rarely attained, and it is because the work of real artists in this line is rarely seen and still more rarely appreciated that the very existence of such an art is practically ignored or denied. If City Park Boards realized what a trained park maker is capable of creating out of a given piece of ground they would never content themselves with asking an engineer or surveyor or mere gardener to design a public pleasure-ground. We ought to have reached a stage of civilization when it is no longer believed that any unskilled journeyman is competent to lay out a park or garden, or pass judgment on the plans of a park or garden. If any artist needs sound judgment united with taste and training it is the man who studies public and private grounds and prepares them for the use and enjoyment of man.

WE have already taken occasion to say that the opposition to the recently established forest reservations which is made by members of Congress from certain of the states in which they are situated is not shared by all the people. The *Miner and the Electrician*, a paper published in Spokane, Washington, speaks of President Cleveland's act as one of the most statesmanlike measures that ever emanated from the White House. It characterizes the opposition to the reservation principle as extremely shortsighted and selfish, and adds that people of intelligence, whose judgment is not warped by any money considerations in the immediate future, see the wisdom and justice of the act. In fact, it is the people in the neighborhood of the reservations who will receive the most substantial benefit from them, and the future population of the great north-west has rights which the people of this gen-

eration are bound to respect, in spite of the protests of timber sharks and mining promoters who feel that their designs upon the Government domain are in danger of defeat. No doubt, there are many men who honestly think that the proclamation will work hardship to the regions in which the reserves lie, but any one who reads the statement of the commission published in this journal two weeks ago and notes how carefully every privilege of settler, prospector and miner has been considered, must come to the conclusion that no legitimate privilege is imperiled, but that the rights and property of all the people are preserved and guarded against attack by the lawless who think only of their own present benefit.

Pinus flexilis.

THE illustration on page 165 of this issue reproduces a photograph of a remarkably noble specimen of the Rocky Mountain White Pine, *Pinus flexilis*, which is standing in front of the United States military post in the Yellowstone National Park, in Wyoming, where it is growing at an elevation of about 7,000 feet above the level of the sea, and at three feet above the surface of the ground has a trunk diameter of nearly five feet.

Pinus flexilis is the first of the Rocky Mountain conifers known to science, having been discovered in 1820 near the base of Pike's Peak, in Colorado, by Dr. Edwin James, the naturalist and surgeon of Long's Expedition to the Rocky Mountains, who described it three years later in his journal of this expedition. It is one of the five-leaved species, although it differs from our eastern White Pine in its usually shorter cones, much thicker cone-scales and nearly wingless seeds, and is more like the Swiss Stone Pine, *Pinus Cembra*, than any other American Pine, differing, however, from that species in the internal structure of the leaves. Never forming very extensive forests, *Pinus flexilis*, which owes its name to the flexibility of its stout and extremely tough branches, is widely distributed from Bow River, in Alberta, southward along the Rocky Mountains to eastern Texas and westward over the mountain ranges of Wyoming, Montana, Colorado, Utah and Nevada to south-eastern California, where it occurs on several of the desert ranges, and even crosses the summit of the Sierra Nevada to the upper waters of King's River, where it grows up to elevations of nearly 12,000 feet above the level of the sea. It is abundant also on many of the mountain ranges of Arizona and New Mexico, and, no doubt, extends over our southern boundary. Most frequently growing singly or in small groves and among other conifers, this Pine is the principal tree on some of the foot-hills of the eastern slope of the Rocky Mountains in Montana, and on many of the ranges of central Nevada between 7,000 and 10,000 feet above the sea-level it forms extensive forests, and is the most valuable tree of the region, giving the name of White Pine to several mountain ranges and districts. In northern Arizona and New Mexico it grows to its largest size, here sometimes producing cones eight or ten inches long, although the cones on this tree growing in Colorado and northward are often not more than three or four inches in length. The Rocky Mountain White Pine is a tree usually forty or fifty feet in height, with a short massive trunk from two to four, or rarely five feet in diameter; occasionally, however, it attains a height of seventy or eighty feet, and at high elevations on the mountains of central Nevada it is frequently reduced to a spreading shrub with stems only two or three feet tall.

Our illustration gives a good idea of the habit of this tree as it grows under favorable conditions, although on the mountains of northern Arizona it frequently produces taller and straighter trunks, which here and in Nevada and Arizona are frequently manufactured into lumber.

Pinus flexilis has been in cultivation in this country and in Europe since 1861, when Dr. C. C. Parry collected seeds of this tree and of several other Colorado conifers and sent them to Dr. Asa Gray for distribution. In the eastern states

it has grown miserably. A few of the plants raised from Dr. Parry's seeds, however, have survived, but at the end of thirty-five years are not more than five or six feet high, with feeble branches and scanty foliage. In England it appears to be more successful, and there has recently appeared in *The Garden* a description of a specimen in the Royal Gardens at Kew which produced cones last year. This tree is now twenty-five feet high, with a trunk two feet nine inches in circumference at the base, and two feet in circumference at six feet above the surface of the ground. It is as a curiosity that *Pinus flexilis* will be cultivated in this country and in Europe, and its chief interest and value is in its ability to flourish and produce merchantable timber in such arid regions as New Mexico, Nevada and south-eastern California.

The Park Systems of Minneapolis and St. Paul, Minnesota.

ABOUT thirty years ago what was then the little town of Minneapolis held a town meeting to consider the purchasing of twenty acres of land for a public park. The opposition to the movement ridiculed the idea that the city would ever extend far over the prairies, and argued that the town itself was then all park.

Fortunately for the still growing city, public spirit prevailed. By 1883 the sentiment in favor of city pleasure-grounds had risen so high that the Council called to its aid a landscape-architect of experience and reputation, Mr. H. W. S. Cleveland, who outlined a scheme for a system of parks, and, above all, of parkways on each side of the Mississippi River, which, if its suggestions could be fully carried out, would give the twin cities of St. Paul and Minneapolis a magnificent and unique system of boulevards and pleasure-grounds.

Upon the lines indicated, with such slight changes as were incident to the rapid development of the city, Minneapolis has worked. And though business depression and other causes have prevented the carrying out of the entire plan, an important beginning has been made by the purchase of land in desirable neighborhoods, and by securing from destruction high banks of the river below the city. St. Paul has not followed this worthy example, and seems disposed to let slip its opportunities and not yet to have awakened to the importance of handsome approaches to its parks, nor even to the crying necessity of buying land to add to them before it becomes too costly.

In 1883 Minneapolis had a population of one hundred thousand souls and a park area of about eighty acres, all told. But the far-seeing policy of Mr. Cleveland was designed to meet the needs of seven times that number of persons. The present park area of Minneapolis, though less than the original scheme provided for, is nearly 1,553 acres, including twenty-three and a half miles of parkways and boulevards. A riverside park has been laid out, and also a strip along the well-wooded eastern bank of the Mississippi has been secured. A fine drive is thus afforded and a park frontage of two miles along the river. It is possible that there may be ultimately a boulevard along its shores to Minnehaha Park, extending south to the military reservation of Fort Snelling; and a recommendation has been made that Lake Amelia be purchased for use as a reservoir to hold the surplus water of the rainy seasons for the use of the Minnehaha Falls during seasons of drought. It is the effort of the Park Commission to secure the west bank of the Mississippi also for the people, and to obtain permission to hold the picturesque region to the south between Minnehaha Park and Fort Snelling, owned by the United States Government.

In addition to the river frontage, Minneapolis has secured on the opposite side of the city a fine chain of lakes, some surrounded and others skirted by parkways. Lake Harriet has an extent of 353 acres, and the Lake of the Isles covers a hundred acres.

Generous donations have been made by public-spirited

citizens, fifty-seven of whom have given land for public use. Of the \$2,250,000 that the Minneapolis parks have cost up to this time, a million has been contributed by citizens, who either gave the land outright, or continue to pay for it in yearly installments of ten per cent. for ten years. The schedule of parks for 1896 enumerates forty-eight different parks and city squares, ranging in size from a fraction of an acre to nearly two hundred acres, and there are plans on foot for a still greater extension of the system. Elaborate reports are yearly published, containing photographs which show the charms of the reservations, and it is the aim of the Commission to rival Boston in the extent and beauty of the pleasure-grounds. Playgrounds for the children are not forgotten, and the water frontage affords admirable opportunity for sports of all kinds in summer and winter, boating and skating alternating with each other in making the region of the lakes attractive to the young, while electric cars render the grounds easily accessible.

Though the resources of the city have not been large enough to greatly develop its system, the authorities have wisely expended them in securing land in different parts of the town while it could be bought at a moderate price, trusting to the growing feeling of the importance of parks to enable them to care for the property as it deserves.

The parks of Minneapolis fortunately possess such beauty of lake and river, wildwood and glen, that even in their undeveloped state they are full of attraction. The banks of the Mississippi on both sides for some miles below the city have a height of 150 or 200 feet, and are even precipitous in places. These banks are covered with a magnificent growth of trees and shrubbery. Elms, Oaks, Lindens, Ashes, Buttonwoods, Cottonwoods, Birches, Cherry, Willows and Hornbeam are found there, interspersed with fine specimens of White Pine and an undergrowth of flowering shrubs similar to those of New England. Little rivulets and springs abound, and on the eastern side two or three natural cascades tumble over the rocks, one of which, known as the Bridal Veil, has a peculiar loveliness.

One can take a train or a river steamer from Minneapolis or St. Paul to Minnehaha Park, situated at the junction of the stream of that name with the Father of Waters, and find there a wild sylvan region of one hundred and twenty-five acres in extent, containing the famous silvery waterfall which hurries over the stratified rocks into the glen below, amid a surrounding of picturesque wooded hills, green meadows and running brook, "a New England picture set in a prairie frame." The slender branches of the trees nearly meet above the rushing stream, here and there crossed by a rustic bridge, and the "Laughing Water" dashes into spray over its stony bed after leaping headlong from the cliff. In winter the great ice columns and boulders heaped high with snow have an impressive aspect, and at all seasons the glen and the waterfall are beautiful. From this park, Minnehaha boulevard, a broad avenue comprising nearly two hundred acres, leads to the chain of lakes which bounds the city on the west. Parks and parkways abounding in trees connect these great sheets of water, and another handsome parkway at the northern end leads back into Minneapolis. Thus the city grounds are provided with easy and desirable approaches from both directions, and electric cars furnish transit for those who cannot drive to them.

The lake parks are visited more frequently than any of the others, and though the improvement of the driveways is still incomplete, the outlooks over the wide, blue expanses, and the noble opportunities afforded for all sorts of water sports, make them very popular and of untold value.

Minneapolis is situated on level ground, but St. Paul is built mostly on the high bluffs of the winding Mississippi, whose valley, from Minneapolis down past Mendota and Snelling, through the city, averages half a mile in width. No better site exists for a grand street than Summit Avenue, and no lovelier views can be found anywhere than those from the Indian Mounds Park and the proposed river

boulevard, but St. Paul does not show such evidences of forethought as distinguish its active rival. Mr. Cleveland's plan suggested beautifying St. Paul as well as its sister city, but the latter seems disposed to allow its unrivaled advantages of situation to slip away from it, and no permanent provision has yet been made for taking care of even its present inadequate system of parks. Since 1894 it has depended on the precarious appropriations made by the Common Council, and barely enough is raised yearly to take care of its existing parks, only one of which is of real importance as to size, Como Park, which contains 396 acres, the remaining portions of its 453 acres being parceled out into twenty-eight small ones.

Money is expended annually on floral monstrosities, such as the Globe, the Elephant, and Gates Ajar, which might far more profitably be employed in permanent improvements. Meanwhile a plan for the acquisition of a tract on the western shore of Lake Phalen to provide a park and boulevard with exceptional water privileges has been before the Board of Public Works for years. This is a desirable area of 129½ acres, and an assessment for its purchase was completely made out last fall, but revoked again in the month of March, 1897; and, moreover, the superb site of the park of Indian Mounds, commanding a wide and varied prospect, and which consists of seventeen acres enclosing the curious tumular antiquities from which it takes its name, has never been enlarged, though the adjacent vacant blocks could now be purchased at a very low rate, much to its advantage.

If these three parks (Como, Phalen and Indian Mounds) could be put on a proper footing and enlarged to the requisite dimensions, the present needs of the city would be reasonably supplied, though it is a pity to lose time before securing the land on the western bank of the Mississippi for future parkways, such as Minneapolis is provided with already.

The approaches to Como Park are unsightly and inconvenient. An avenue eighty feet wide was originally designed to give access to it, but no improvements according to the original plan have been carried out, and the street is disfigured by a street railway running through its centre. The City Council only last year refused to appropriate the small sum necessary to make of this a suitable parkway, with tracks laid in turf on each side. Other plans on foot for public avenues may be some day perfected, but the original magnificent idea of a river boulevard, running seven and a half miles to the Minneapolis line, embracing an uninterrupted panorama of picturesque views along its whole length, has never been carried out, though the land expense would now be very moderate, and the Park Commissioners reiterate their appeals for its purchase.

Lake Como and the Phalen-Gervais group are the extreme southern part of the galaxy of lakes which spangle Ramsey County. Noble scenery studded with other lakes lies due north of these for nine miles, the addition of which to its park system would be greatly to the advantage of the city and its people.

There are 102 acres of water in Como Lake, which has two winding tributary basins in addition to its larger surface. Around this lie over two hundred acres of land with fourteen miles of driveway and twenty-two miles of walks. A heavy natural growth of Oaks shades the region, which is densely wooded in parts, and in others diversified by open lawns, the whole affording a delightful resort. Four hundred and fifty thousand visitors were carried to this park in the summer of 1895 by the electric line alone.

Phalen is a natural park consisting mainly of native forest surrounding 450 acres of water surface, and the plan of improvements contemplates the deepening and widening of a small stream a little over a mile long which connects it with Lake Gervais, so as to make a slack-water channel for boats and motor barges, which would open a nearly four-mile stretch of water promenade through the beautiful scenery of the lakes and intermediate valley. It is a pity that provision for securing the land and for carrying out the

unrivalled system of boulevards and avenues should not be made before the opportunity is lost.
Hingham, Mass.

Mary C. Robbins.

L'École Nationale d'Horticulture de Versailles.

IN connection with the interesting discussion on Horticultural Education with which several correspondents have been enriching our columns, the following sketch of the great horticultural school of France will, we hope, be considered timely. It was prepared for *The Gardeners' Chronicle* by Jules Gachelin, once a student at Versailles:

The National Horticultural School of Versailles is situated in the grounds of the late "Potager du Roi Louis XIV.," which was established in 1678 by De la Quintinye, inspector-general of the Royal Gardens, in the reign of Louis XIV. Although the grounds and conditions were not very favorable to work upon, he distinguished himself by producing a real "chef d'œuvre" where everything could be grown to perfection. The story says that the king would have asparagus in December, radishes and lettuces in March, strawberries in April, peaches in May, etc., and that he had them, which at that time was a very rare thing.

The glass-houses, where all the fruit, vegetables and flowers were grown, have now been replaced by better ones, but the shape of the garden, with its fine terraces and walls full of beautiful fruit-trees skillfully trained, is the work of this venerable gardener, and there are still a few big Catillac Pear-trees which are supposed to have been planted by his own hands, and which bear every year a heavy crop.

Until the first days of the Third Republic, all the produce of these gardens was used to supply the tables of the sovereigns; and it may be said that Monsieur Thiers, the first president, made use of them up to 1873, when the National Assembly decided that these gardens and buildings should be used as the site of a superior school of horticulture where nothing should be spared to train good professional and practical gardeners.

The school was opened in October, 1874, under the directorship of the late Monsieur Hardy, formerly superintendent of these gardens. The announcement of the opening of the school gave great satisfaction throughout France and abroad, and although the Government gave an annual grant of upward of £4,000 toward the expenses of the school, and £800 a year for scholarships, help was also sent from every part of the Continent and abroad in the form of money, or in contributions of plants of all sorts. Owing to the increasing success of the school every year, the number of students is limited, the average for the last three years being 100 to 110 altogether.

The students to be admitted have to pass an examination in elementary subjects and gardening, the first six on the list receiving a scholarship from the Government of £40, unless they already hold one given by a society or province. Those who hold no scholarship of any sort, but are supported by patrons or can afford it themselves, can enter the school, provided that they have given satisfaction at the examination; any one may be admitted between sixteen and twenty-six years of age. The studies extend over three years, and are divided into two sections, theoretical and practical.

The lectures are on French, grammar, mathematics, geometry, book-keeping, surveying, physics, meteorology and chemistry applied to horticulture and agriculture; zoölogy, entomology and botany (first year, classification of plants, description of flowers, etc.; second year, anatomy of plants, flowers, descriptions of diseases, etc., cultivation of fruits under glass and out-of-doors, vegetables under glass and out, flowering plants in and out, and ornamental trees), freehand and landscape drawing and water-colors. Different rooms are used for these lectures, which are given by professors appointed by the Government. Various collections of insects, animals, flowers and fruits are open to the students, as well as laboratories in which to experiment in physics, chemistry botany, etc. There is also a field for experiments.

The practical section includes five departments; the student has to remain a fortnight in each under skillful head-gardeners. There are (1) fruit-trees; (2) fruit-trees under glass, and forcing-houses where are grown Grapes, Peaches, Strawberries, Figs, Melons, Pineapples, etc.; (3) hot-houses and propagating-houses; (4) outdoor and soft-wooded plants—a botanic garden, where all sorts of medical and economic plants are grown and carefully labeled; (5) the kitchen garden, where are grown vegetables, forced and outdoor. At the end of every fortnight each student has to report upon his work. In the summer there are frequent excursions made to the chief nurseries or principal places, where the students see the best ways of culti-

vating various plants; and they also attend the horticultural conferences, which are given occasionally, and the shows.

There are two examinations every year; one at Easter to show the student what tasks he has to work at, and one in July to class them for the year; besides these, the professors question the students at intervals throughout the year. Each student has to obtain a certain number of marks to be able to pass through the second year's course; those who do not attain them are declared unable to continue their studies, and leave the school. At the end of the three years they pass a general examination in every branch, theoretical as well as practical, and if they give satisfaction, a certificate is awarded them, and the first two obtain a scholarship from the Government, enabling them to pursue their studies abroad.

Every year the director receives from all parts of the Continent and abroad applications for men to serve as directors of botanic gardens and town gardens, for head-gardeners, superintendents of colonial gardens, professors in schools and horticultural societies; and I may say that some of the most important positions in France and in the colonies are filled by ex-students of Versailles, not to mention those abroad. From Hungary, Roumania, Spain, Portugal and Germany, every year a good many persons come for the same purpose as do the others, to improve themselves at the school; and English, Belgians, Turks, Russians, Japanese, Swiss, Italians, Spaniards and others are found among the students; and they return benefited by the experience gained in the National Horticultural School of France.

In conclusion, I may mention that there is an association formed by the students, which publishes a yearly bulletin which keeps a record of the position of the members, and includes articles on various subjects of interest, including the experiments made at the school during the year.

Foreign Correspondence.

London Letter.

SPRING GARDENING IN LONDON.—The tendency of garden art in England now is more in the direction of the natural style than ever. The crusade against summer bedding arose not so much from a dislike for the plants used as from an objection to their misuse in the production of gaudy formal patches of color. We have summer bedding still, but the plants are grouped more after nature's plan, and if a bed of scarlet Geranium or purple Heliotrope is employed it occurs in a position where the effect is good and artistic. The form of the bed is often the cause of its failure to please. If we could do away with the circular, kidney-shaped, crescent-shaped or rectangular bed, and substitute an irregular piece of broken ground, to be ultimately covered by leaf and flower, our gardens would be greatly improved. In any case the geometrical star, or crescent, or monogram form is generally offensive. The prevailing practice among the best gardeners here is to use masses in beds generally round, but with its outline broken as much as convenient by the irregular growth of the plants in it. Only one kind of plant is used for each bed, unless a second one be employed for a double purpose, as, for instance, Pansies under Roses, or Lilies with Rhododendrons. The multicolored bed of Geranium, Heliotrope, Coleus and Lobelia, so popular twenty years ago, was only an exaggerated form of what is bad taste in color mixing.

What is true of summer bedding applies with equal force to the case of spring gardening—that is, to the use of hardy early-flowering bulbous plants for floral display out-of-doors. One has only to compare the beds in the terrace garden filled with regularly placed Hyacinths, Tulips and Daffodils with the effect produced by the same plants when planted broadcast, as it were, in bank or glade, or by the water-side. Sir Watkin, Emperor, Empress and Poet's Narcissi are attractive anywhere, whether in bed or flower-pot, but their grace and charm are nowhere so evident as in the grass glade or slope, or in irregular groups on the lawn. A bed filled with Crocuses is pleasing until one has seen a grass slope studded with them. Tulips and Hyacinths are also much more effective when grouped "any how" on the grass slope or in the wild garden than when trussed on the regulation coffee-colored flower-bed. The present

spring has seen an enormous development of bulb gardening in the parks and public gardens of London, and in almost every case the difference between the wild garden and the formal bedding styles is displayed by a liberal use of both. In some cases the attempts at the more artistic

art is needed for the production of a pleasing wild garden, so called, than is commonly supposed. To so arrange tree and shrub and herb and grass as to produce a pleasing natural effect requires knowledge and taste of no mean order. It is quite true that many so-called attempts at



Fig. 19.—*Pinus flexilis* in the Yellowstone National Park, Wyoming.—See page 162.

style is a failure through faulty planting, either by sticking the bulbs into the ground at equal distances apart, or by planting them in positions where they are out of harmony with their surroundings. Such attempts bring the wild-garden style into ridicule. As a matter of fact, much more

natural gardening deserve the sneers of such authorities as Mr. Inigo Thomas, who calls them wildernesses, not gardens.

The plants used here for spring gardening are generally of the commonest and cheapest character—Daffodils,

Hyacinths, Tulips, Crocuses, Snowdrops, Chionodoxas, Anemones (blanda, apennina, hortensis, nemorosa), Cyclamens, Winter Aconite, Christmas Roses and other Hellebores, Primroses, Cowslips and Polyanthus. If we could obtain Irises of the reticulata section, the big Saxifragas, Adonis, Leucojum and Erythroniums in sufficient quantities they would serve equally well. Emphasis must be placed on the recommendation to employ all these plants with taste. Thus, Cowslips dotted over a grassy slope or lawn would be in good taste, but Polyanthus in such a position would not be. Chionodoxas in the grass do not look at home, and, in fact, will not thrive there, but scattered among the stones and roots of the rock-garden or on large borders they have a charming effect. The idea is, however, the main thing. Once perceive that all such plants as those named are better suited for what we term wild-gardening than for the formal flower-bed, and ways and means will readily suggest themselves.

Mr. Burbidge stated in his paper on bulb culture that Daffodils and Tulips could be grown as easily as Potatoes, given the requisite technical knowledge and suitable soil and climate; the same applies to the cultivation and increase of all the plants here recommended for spring gardening. They must be abundant and cheap before they can come to be used in large quantities, but given the demand and the supply will certainly come. It is not many years since Emperor and Empress Daffodils were worth pounds a dozen; now as many pounds will buy a thousand. Chionodoxa and Galanthus Elwesii used to be doled out in small packets to be grown with care in the flower-pot; now one can buy them at so much per bushel. Still, even now we cannot get enough of them. When people see the effect such plants produce at Kew and in other gardens when used in quantity they have the desire to reproduce this effect in their own gardens. I believe there is a great future for all easily grown plants which flower freely and are effective in the open air in spring. Horticultural taste, in England at any rate, leans in that direction.

London.

W. Watson.

Cultural Department.

The Hippeastrums.—I.

SPECIES AND VARIETIES.

I BEGAN to cultivate Hippeastrums in 1881, and since that time I have added new material from year to year. Although the hybrids are much more striking than the species, I have collected as many of the latter as I could get from dealers and from collectors in tropical America. In many cases I did not succeed in obtaining the true species from their native home. I obtained many species from southern Brazil, British Guiana, Venezuela, Central America and the Lesser Antilles. From the mountains of the Andes, particularly in Peru and Ecuador, where some of the most beautiful species grow, I have as yet been unable to procure material.

All these plants are known popularly as Amaryllis, while in science they are called Hippeastrum. The true scientific term Amaryllis belongs to the Belladonna Lilies of south Africa, which have very similar flowers, but different bulbs, leaves and seeds, the latter being few, large and fleshy, while the seeds of the Hippeastrums are many, flat and light, and can be carried away easily by the wind. All the Hippeastrums are strictly American, being found in the tropics from southern Mexico southward to Paraguay and Buenos Ayres. Hippeastrum equestre has been naturalized in southern India and also on several islands of the Indian Ocean, and the true Amaryllis Belladonna (Belladonna Lily) of south Africa has been detected in the island of Jamaica and also on the Andes of Colombia, on the banks of one of the branches of the Rio Cauca, where it was found by Monsieur André, who supposed he had discovered a new species of Hippeastrum. In *The Gardeners' Chronicle* of 1880 it was described and named after its discoverer, Hippeastrum Andreanum. Only recently it has been ascertained that this is the true Belladonna Lily escaped from cultivation.

It is a singular fact that all the Amaryllis are called Lilies by persons with no knowledge of botanical science. Thus, Johnson's Amaryllis is known in the south as the Red Lily; Hippe-

astrum equestre as the Barbadoes Lily, etc. But the name of the nymph Amaryllis has been connected with these plants since the days of Linnæus, and is almost as much a part of the modern languages as Lily, Tulip, Hyacinth or Magnolia. The comparatively unpoetical term Hippeastrum, Knight's Star, will probably never find favor with the general public.

The Amaryllis which is most commonly met with in the gardens of the southern states is the easily managed hybrid Hippeastrum Johnsonii, raised by Mr. Johnson, a watchmaker at Lancashire, England, in 1810, from H. Regina and H. vittatum. This was the first species I tried, and I grew it in the open air in Texas, where it soon formed large clumps. Its brilliancy, fine form, delicate fragrance and luxuriant growth led me to other species and hybrids, among which are the following:

Hippeastrum vittatum, from the Andes of Peru. This was introduced into Europe in 1769, and it has become one of the most common as it is among the easiest to grow. Though not of such fine form and brilliancy as most of the hybrids raised from it, it is a beautiful flower. The ground color is white, in the tube greenish, striped, and sometimes veined with crimson. The scape usually bears four delicately fragrant flowers. The common strain of Amaryllis found in most greenhouses originated from this species by crossing it with other species, or in crossing its different hybrids among each other. Far superior to the species is the variety H. vittatum Harrisonianum, sent to Europe from Brazil by William Harrison, the introducer of H. aulicum and many Orchids from the Organ Mountains. The flowers are very large, pure white, with two red stripes. They are of fine form and substance and very fragrant. It was figured in *The Botanical Register* on plate 988. Some botanists regard this as a probable hybrid between H. vittatum and H. solandriiflorum. My bulb, which was received from B. S. Williams & Son, London, does not grow very luxuriantly, although it flowers regularly in spring.

Hippeastrum equestre, the Barbadoes Amaryllis, Barbadoes Lily, or Orange Lily. This is the type on which the genus Hippeastrum has been based by Herbert. This species is found throughout tropical America from Mexico and the West Indies south to Brazil and Chili. I saw it first in April, 1886, in south Florida, where several hundred flowers were standing close together and produced a wonderfully brilliant effect against a background of tall Pampas Grass. The color of the large open flower is a bright orange-red, with a yellowish white star in the tube. Two to four flowers are usually borne on a scape fifteen to twenty inches high. The strap-shaped leaves, of which six to eight are produced by each bulb, are about eighteen inches long, of a glaucous-green color. As the flowers appear when the plant is in full foliage, the effect is indescribably striking. I have seen clumps consisting of fifty bulbs, almost all of which were flowering. In the greenhouse I have had bulbs of this species from Florida, Barbadoes, St. Vincent, Jamaica, Nicaragua, Venezuela, British Guiana, Honduras, southern Brazil, etc. They vary a good deal in size as well as in the brilliancy of their flowers. Those from St. Vincent, belonging to the variety H. equestre major, are the most easily grown, the most vigorous and brilliant. H. equestre Roezli, gathered by the celebrated collector in the Andes of Bolivia, has a lighter color and smaller flowers. H. equestre pyrochroum appears to be entirely different; having much stronger roots, more robust leaves and scarlet flowers with a greenish centre. This is by far the easiest grown of all the H. equestre tribe. There is also a semi-double variety which I received from St. Vincent. H. equestre flowers freely for the first year and the leaves grow normally, but when the winter sets in, if it is kept moist, the roots rot and the bulb soon follows, and if kept dry the bulb begins to shrivel and decays in the inside. The few bulbs that may remain sound are only with great pains restored to a healthy condition.

Hippeastrum Regina, a native of southern Mexico, Central America, the West Indies and south to Peru and Brazil. This is one of the most beautiful of Amaryllises. Introduced into cultivation in 1728, it was called Liliun Regium by Dr. James Douglas in honor of Carolina, wife of George II. It is a strong plant, with large, massive, dark green glaucous leaves. In their earlier stages the flowers show a deep purplish brown hue. The strong scapes, of which two are usually produced by each bulb at the same time, are four-flowered and from twenty-six to thirty inches high. The flowers are large and of a very brilliant orange-scarlet color. Each segment has a broad white stripe in the centre extending two-thirds of its length from the base. The tube is greenish. It is easily grown, and flowers better in the window than in the greenhouse, and really most Amaryllis do better with amateurs than with florists. This species has been fruitful in the production of hybrids; the first known cross, H. Johnsonii, having been

raised from it. It multiplies rapidly by offsets, which cannot be said of many others. There is also a double form known in cultivation as *H. Albertii*.

Hippeastrum psittacinum, the Parrot *Amaryllis* of southern Brazil. This was introduced to European gardens in 1814. Although not a showy species, it is interesting on account of its peculiar flowers. It has been frequently used in raising hybrids. One of the most robust *Amaryllis* now in cultivation, the brilliant Empress of India, was raised by Mr. de Graaf, of Leiden, by crossing this species with the hybrid *H. Gravianum*. It is a strong-growing species with stout flower-scapes two to three feet high, each bearing from two to four large flowers of a greenish ground color, beautifully veined, penciled and margined with bright crimson. Although of a robust constitution, it is easily lost in the greenhouse if its requirements are not carefully met. If watered thoroughly only a few times in winter when at rest, or if kept in a moist or damp place, it invariably rots. The variety *H. psittacinum major* has larger flowers than the common form. It produces its flower-scapes before or contemporary with the long strap-shaped leaves. This species, as well as *H. vittatum* and *H. Reginae*, I have obtained true to name and in best flowering condition from Mr. E. H. Krelage, of Haarlem, Holland. I have found that these bulbs which have been thoroughly acclimatized do much better and give more satisfaction than those imported directly from their native country.

All the species so far considered are deciduous—that is, they have a season of rest when the leaves die down, and a season of growth. They must be kept entirely dry during winter and should only be watered when the flower-scape or the leaves have grown a few inches high, and then only cautiously, once in a week being enough until the leaves or the flower-scape are almost fully grown. If the drainage in the pots is perfect, they require much water when in full flower and foliage. As soon as the leaves begin to die down water must be withheld almost entirely.

Hippeastrum aulicum is an evergreen species of very robust constitution. It was introduced to cultivation from the Organ Mountains of Brazil in 1819. Mr. Harrison, its discoverer, found it abundantly in the rich vegetable mold on shady mountain-sides. The peduncle grows from eighteen to twenty inches high, bearing an umbel of two flowers of a very rich, deep, velvety crimson, appearing as if covered with gold dust; the centre is green and the form of the flowers not good, compared with our modern race of *Amaryllis* hybrids. The flowers appear invariably late in the autumn or early in winter. From this magnificent species many fine hybrids of special merit have been raised, among which *H. Ackermanni pulcherrimum*, one of the most glowing, was obtained by crossing it with *H. Johnsonii*. *H. aulicum* is easily grown and flowered if care is taken that the leaves are kept green. Water must, therefore, never be entirely withheld, as the plant is evergreen. A more satisfactory and more easily grown form of this noble species is *H. aulicum robustum* (*H. Tettani*, *H. Rougieri*), which was introduced from the German colony, Blumenau, south Brazil, by Dr. Blumenau in 1848. Under the name of *Amaryllis Tettani* large quantities were sent to Berlin and Erfurt. The foliage is very robust, being densely speckled with minute purplish spots on the underside. The two flowers are of a deep crimson with a green star. The bulbs multiply rapidly by offsets, unlike those of the type, which are slow in this respect. The variety *H. aulicum platypetalum* has broader segments and a larger green star, and another variety, *H. aulicum stenopetalum*, has narrower segments than the type.

Milwaukee, Wis.

H. Nehrling.

Notes from Baden-Baden.

AMONG *Muscari* I beg to mention the variety *Freynianum* of *M. azureum*, which is the best of the three varieties; its spikes are the largest and the flowers are the best in color, a bright turquoise blue. It flowers early enough, being in bloom here from the middle of February to the middle of March. A little later comes another handsome variety, *M. Szovitsianum subcœruleum*, with robust and showy spikes of pale sky-blue. Soon after *M. polyanthum* shows its large deep blue spikes in great abundance, as it flowers more freely than any kind under cultivation, and is also very showy. *M. elegans* is another gem among these spring flowers; its rolled leaves and the uncommonly long narrow spikes beset with comparatively large individual flowers of deep ultramarine distinguish it as a very showy plant.

Tulipa Kaufmanniana is among the earliest of its tribe, and its varieties *Aurea* and *Pulcherrima* are, perhaps, the most gaudily colored and largest-flowered Tulips. Both have out-

side segments of intense, slightly glaucous scarlet encircled by a broad orange-yellow rim; inside they are of a very deep brilliant yellow, with a few scarlet streaks and blotches. *T. suaveolens* is another striking species; the large flowers are all over a deep crimson-scarlet. This species seems to be very rare, and the true plant is scarcely met with in the trade.

Baden-Baden.

Max Leichtlin.

April Irises.

BETWEEN the flowering of the early-blooming Irises and the first of the rhizomatous section, say, usually from late March to late April, there are a few interesting species which are as distinct as they are attractive. These Irises all belong to the *Juno* group of the botanists. In a general way they are distinguished by having bulbs with a few thick scales, very thick fleshy roots, which are formed before they go to rest and by the exceedingly small standards of their flowers. They have leaves somewhat Leek-like, stem-clasping and distichous. Some of the *Juno* group flower in the early winter, and are grown under protection in winter, but the main body is in evidence at this season. Owing to their hardiness and distinct habit, so different from other sections of the family, they may be considered very desirable plants for the hardy border in certain positions. They are bulbous plants, natives of Asia and localities where the seasons are somewhat sharply defined into wet and dry periods. Different plants from the same locality will grow under differing conditions, as some of them have a certain adaptability to unaccustomed environments, but in a general way the proper treatment of deciduous bulbous plants, natives of countries having very dry seasons, is to supply them freely with moisture as soon as they start into growth and as long as they continue to make progress, and to withhold water as soon as indications show that growth has stopped, keeping them as warm and as dry as possible during the resting season. It is difficult to imitate the conditions of a dry steppe in an ordinary garden, and it is sometimes perplexing to choose a position in the open where such plants will thrive. Raised borders, with sashes in summer, or even cold frames, are sometimes used, but these are unsightly, and usually the most available place for such plants is at the foot of a wall with a southern exposure. In such a position, however, there is usually a lack of moisture, even early in the spring, while the plants are growing vigorously, and the cultivator must be prepared to supply water when, as is often the case, the March winds dry the soil. In the garden one should use the hose when water is needed, even if the calendar indicates a wet season. Growing bulbs can scarcely be overwatered.

Of this small group of plants, *Iris orchoides* is the most attractive in the borders, both in flower and in the habit of the plant. It produces stems a foot and a half to two feet tall, and as the internodes and flower-stems are longer than those of other species it is more graceful in habit, while the abundant golden-yellow flowers, though individually small, are very effective. In somewhat heavy soil, and a southern exposure, near a wall, *I. orchoides* flowers regularly here, increases by offsets and bears seed. It would probably be well to lift, remove the offsets and replant it at least every second year as there is a tendency of the plants to become too crowded for the best results. The yellow of the flowers of *I. orchoides* is accented by a black blotch on each fall.

Flowering at the same time is a blue-flowered *Iris* from Bokhara and Turkestan, *I. orchoides*, var. *cœrulea*. Though this has the long internodes and stems of the type it is scarcely as graceful. The flowers are larger than those of the yellow form and are a light slaty-blue shading to white, with a bright orange ridge, on each side of which appear deep blue linings. My experience with this form is slight, and I do not know how reliable it is as a border plant. Two years ago I had from Rev. Mr. Gates, of Mardin, a few bulbs of what seems to have been known as *I. Mesopotamica*, but which is more correctly *I. Assyriaca*, Haussk., under which name it has lately been introduced by Herr Leichtlin. This is now flowering at a height of fifteen inches. The flowers are some three inches across. The flowers were described as a milky white, but the writer must have had in mind the whiteness of city milk, for even at first the flowers have a blue tint which deepens as they age. It may be said that the flowers of these Irises open in succession from the tip downward, and usually one from each node. The nodes and flower-stems of *I. Assyriaca* are shorter than those of *I. orchoides*, and the leaves are wider and less shiny.

The prettiest blue-flowered *Juno Iris*, however, is *I. Sindaricensis*, which is now in bloom. The leaves of this plant are not as smooth as those of the others, and are slightly glaucous. The flower-stems are short and the flowers rather larger and

have wider petals than those of *I. Assyriaca*. They are frilled on the falls and have a very pleasing slaty blue color.

Iris Caucasica and its variety major are dwarf kinds of the same section, with few narrow leaves with horny margins. The flowers are of that degenerate yellow euphoniouly described by the plant dealer as "light lemon-yellow." As it is improbable that any one's color sense can be gratified by such a futile attempt at yellow, I hesitate to commend this species as a garden plant.

Iris fumosa is another yellow-flowered Juno which I have not yet seen in flower, though it is in bud in the border. This Syrian species is said to show a smoky hue of yellow which is not promising, as smoky-hued Irises usually are more curious than brilliant. These plants flower at that unhappy season when the weather is never twice alike. The flowers are indifferent to changes of temperature, like most early flowers, but they do suffer severely from the great enemy of us all—the high drying winds—so that if a sheltered spot can be given them it will be appreciated.

Elizabeth, N. J.

J. N. Gerard.

Correspondence.

The Red Cedar.

To the Editor of GARDEN AND FOREST:

Sir,—I was very glad to see this tree recommended in your paper for more general planting in our parks and private grounds. It certainly seems strange that a tree of so much beauty should be neglected, especially in these days when our native trees and shrubs are coming so rapidly into favor. I have found it an unusually easy tree to transplant, and have moved many from ten to fifteen feet in height, with but slight loss; they should, however, be very heavily cut back when moved. In fact, I know of no tree that stands the pruning-knife so well; trees that have become badly misshapen from overcrowding can be readily made into fair specimens by the use of the knife.

Although usually we find these trees growing in rough, stony places, they respond quickly to a more generous treatment, and their annual growth is greatly improved when planted in rich soil. I had on my land some large clumps of poor Cedars, crowded together and choked by a growth of White Birches. After removing the greater part of the Birches, I thinned out the Cedars, subjecting the remaining ones to a vigorous pruning. The soil was then enriched as far as possible, and the result is that the Cedars are greatly improved, and in many cases have become good bushy specimens. The effect produced by so radical a treatment was at first undoubtedly discouraging, but after one season the Cedars had shot out beyond their amputated limbs, and the loss of picturesqueness proved to be but a temporary one. On many country places such clumps are common, and I would advise the owners to experiment on a small scale if they are fearful of the treatment being too radical, and judge for themselves.

This power of enduring the pruning-knife or shears makes the Cedar especially valuable for formal gardening, as you mention, but the true place for its use seems to be the one indicated by nature—that is, for covering the tops of rocky knolls and pastures. Almost all our large parks have appropriate places for such trees; in Franklin Park, near Boston, we have a piece of land to which they would seem to be especially well adapted. In fact, many of the hills were partly covered with old Cedars. Unfortunately, as a facing for these rough, picturesque knolls, thousands of Japanese *Retinosporas* have been planted, looking sadly out of place, and mostly in poor condition.

The peculiar bronze color which they assume in winter has always seemed to me to be a very beautiful one, especially when seen in connection with the bluish green of the White Pine, or when an occasional White Birch is allowed to remain to relieve the soberness of their winter hue. There seems to be, moreover, a great variety of color in the different specimens, some of them being so glaucous as to closely resemble the *Retinospora squarrosa*.

Farther south, in Virginia and Florida, they seem to have a looser and more feathery habit, and the tree loses the rigid upright character so common in New England. At Washington there are many fine specimens, especially at Arlington, where the steep bank of the Potomac in front of the house is covered by some splendid trees that greatly enhance the beauty of the view. In Massachusetts, however, good specimens are rare, and only occur when some tree has had the good fortune to grow undisturbed and alone in some rich pasture.

Wellesley Mass.

H. S. H.

Horticultural Education.

To the Editor of GARDEN AND FOREST:

Sir,—I have been much interested in the discussions in your columns respecting the best methods of giving instruction in horticulture. I do not care to comment upon the various articles, nor upon the subject in general at present; but, in order to add an incidental interest to the subject, I wish to make a brief historical excursion. It seems to be true of any subject that we can never be sure of getting back to the very beginnings of it, and it is none the less true of agricultural education; in proof whereof I now append some statements and propositions made by Samuel Hartlib as early as 1651. The source from which I quote is a little book styled, "An Essay for Advancement of Husbandry-Learning: or Propositions for the Erecting a Colledge of Husbandry: and in order thereunto, for the taking in of Pupills or Apprentices. And also Friends or Fellowes of the Same Colledge or Society. London, Printed by Henry Hills. 1651." This quaint little book was placed in my hands by Hon. Andrew D. White, who recently bought it in London. The copy contains the book plate of the illustrious Arthur Young. The book is a small affair, numbering altogether only seventeen pages, and four of most entertaining introduction. This introduction is the only part of the writing which bears Hartlib's name, but the whole book and scheme are his. He asserts that it is the "Narrowness of our Spirits" which makes us miserable, and that if we were properly awakened to the advantages which lie about us "we could not be without Lucriferous Employments." Wherefore he proposes a school of husbandry. "Why may we not conclude that in the Science and Trade of Husbandry, which is the Mother of all other Trades and Scientificall Industries, a Collegiall way of Teaching the Art thereof will be of infinite Usefulness."

The things which Hartlib would teach are set down as follows:

- (1.) Tillage, or setting or sowing of several sorts of Corne or Graine, for the reliefe and sustenance of man and beast.
- (2.) The breeding of Cattell (in which the breeding of Sheepe may seem particular).
- (3.) The feeding of Cattell.
- (4.) The Use of the Dairie.
- (5.) The planting of Orchards.
- (6.) The planting of Gardens.
- (7.) The breeding and feeding of Swine.
- (8.) The breeding and feeding of the several sorts of tame Poultry.
- (9.) The planting of Hops.
- (10.) The sowing of Hempe, Flax, or Rape.
- (11.) The breeding, preserving and taking of wilde Beasts, as Conies, etc.
- (12.) The breeding, preserving or taking of wilde fowle, particularly of Duckes in and by a Decoy.
- (13.) The making and managing of Rivers, Moats, Ponds, etc., for the preserving and taking Fish of all sorts for the use and sustenance of man.
- (14.) The planting of Woad, and all outlandish rare or extraordinary Roots, fruits or plants.
- (15.) The dreining, fencing, mowing and making of Grasse in Meadows into Hey.
- (16.) The making of Malt.
- (17.) And (that now so exceeding necessary endeavour) the planting all sorts of Wood for Timber or fire.

"As these are encouraged and enabled: so is a Nation more or lesse prosperous, or outwardly happy; both these in their distinct natures or uses are most excellent; and are also (at least ought to be) inseparable companions: of which if either precede it is Ingenuity; for that Industry as it is distinct from Ingenuity, can do nothing till the other have contrived what and how."

The means of securing the establishment of the institution are these:

"That whereas it is manifest, that such a Colledge or Society cannot be erected without the building or buying (at least a long lease at an easie rent, if not the inheritance) of some large and convenient House, with some good quantity of Land adjoining and belonging to it; and it is as manifest that such a purchase cannot be made without good Sums of Money.

"It is therefore desired, that all such Well-wishers to their Country's wealth and prosperity; be pleased to contribute such sums to this good and laudable Worke, as in their own Wisdomes and bounties appear necessary, and deliver the same into the hands of Mr. Samuel Hartlib, whose abundant Zeale for the Publique Good, renders him most worthy to be entrusted therewith, till there shall be a competent Stock obtained for the setting forward of this great and good Worke before mentioned: And to subscribe their Names and Sums; that so the whole Society (when erected) and the whole Nation (when in due time they shall have tasted the sweet effects from hence proceeding) may know to whome to render all due thanks through all Ages, as to the bountifull Promoters of; by contributing to a Designe so much conducing to the good of the present and Prosperity of all Ages to come: a Plentifull Reward to every Noble Spirit.

"It is therefore Offered, that whosoever shall disburse and engage any sum, for the encrease of that Stock, and consequently the employment of the Society: shall by an unerring, unaltering rule, receive yearly; while his money remains in the hands of the said Colledge, for every 100. pound, 20. pound, and so for a greater or lesser sum proportionably. And if any particular Person shall desire to have his sum disbursed, to be employed in any one particular single part of this copious Art here before mentioned; he shall have his desire fulfilled: provided that his Stock be sufficient to drive on that way; and that he be contented to forbear his revenue till nature hath produced the returne.

"And whosoever shall thus engage, shall at any time (upon six moneths warning given) call in and again receive his sum formerly disbursed.

"And all those that shall thus engage, are desired to enter their Names and Sums, by subscribing and delivering the money into the hands of Mr. Samuel Hartlib. And for Security they shall have; As to Law, the Propounders bond; As to Love, the word of him that desires to prove himselfe a just and honest man, to God and man, (to his utmost power) and to all Engagers a faithful Steward."

Having founded the institution to his satisfaction he would next proceed to secure pupils or apprentices; and these were to be attracted by the following plan:

"If any Person of quality have a Son or Kinsman 15. years old or upwards, with whom he will give (besides well-suited him with all necessary wearing apparel, and more, to the value of twenty marks; in such other necessities, as the Undertaker shall appoint) 60.1. in ready money at his first Entrance, and bind him Apprentice for seven years; he shall be in that time faithfully instructed in both the Theorick and Practick parts of this (of all others) most Auncient, Noble and honestly gainfull Art, Trade or Mystery. And at the end of that time, he shall receive at one entire payment, to set up withal, 300. pound. And shall for foure years next ensuing the end of the said 7. years, receive at the end of every year 100. pound more; the better to support him till he have taken sufficient root." . . .

"Into this Colledge also any man may enter himselfe as a freeman, or Friend to, and Member of the Society; upon the following conditions.

"(1.) He must pay down at his Entrance 50. pound, as given to the Society for the encouragement of Ingenuity in the practice of Experiments, for the obtaining of yet more perfection in this (almost) infinite Science.

"(2.) He must bring with him some skill, at least Ingenuity; and testifie himselfe to be a Well-willer to the profession and professors of Good-Husbandry; and particularly to the Master and Fellowes of this Society.

"(3.) He must produce at least 250. pound as a Stock to set up for himselfe, to be driven by himselfe, according to the best direction and assistance to be given by the Master and Fellowes of the Colledge.

"(4.) He shall (not swear, but) subscribe himself under hand & seale, a faithful Seeker of the Advancement of the Mystery and Society; and to be aiding and assisting, to the Master and the Fellowes to his power, at all times, and in all cases, (his own interest always preserved), and to consent and submit to all such Orders, as shall be from time to time made, by the agreement of the Master and the Major part of the Fellowes of the said Colledge, for and concerning the same Society, and to stand to their Award in any case of difference: And not directly or indirectly to discover all or any part of the same Art or Mystery to any person whatsoever, upon any pretence whatsoever, without their consent first had and obtained.

"(5.) He must be always in Commons at the Hall of said Society; at the rate of 8.s. per week, or such other rates more or lesse, as the then present state of things shall require. And he is always to pay off all arrears at the end of each moneth at the farthest, without any deductions for absence how long or short soever. But if he keep a Servant (who must also be in Commons when present) he shall be allowed to deduct for his absence. As also he is not to be accomptable to the Stable for his Horse when absent.

"(6.) He shall at his first Entrance, pay for Himselfe 10. pound, for his Servant 5. pound, for his Horse 40.s. for their habitation: besides providing of all necessary furniture; but be ever after free till death or departure.

"(7.) Lastly, he must be a single man; and if he shall at any time marry, he is from thenceforth to be accompted dead to the Society, to all intents and purposes whatsoever; save onely in point of debt or discovery."

These propositions seem to have been made public before the date of the volume before me, for, toward the close of the book, the writer again addresses his reader personally and

complains of the "Backwardnesse of men" to join with him; and he then resolves the objections which have been urged against the scheme into three categories:

"First, the supposed Impossibility of performing (on my part) the thing promised.

"Secondly, the Newnesse of the Invention or Contrivance, which renders it within the list of things Inspected.

"Thirdly, the Non-appearance of any such good Security as is held sufficient to encourage men to joyne with me freely, fully and speedily (that is, seasonably)."

To these he made answer, and seems to be somewhat impatient that the scheme should not at once arise into fulfillment. How blessed was Hartlib that he had no prevision, and could not know the long travail of two centuries which lay between him and the agricultural school!

Who was Samuel Hartlib? He seems to have been the son of a Protestant Polish merchant who had fled to Prussia to escape persecution. Hartlib emigrated to England about 1628, and died there about 1670. He identified himself with the literary and educational life of his time, and also wrote profusely of agriculture and religion. He was the friend of Evelyn, Pepys and Milton, and the latter dedicated to him, with much praise, his treatise upon education. He appears to have been one of the group from which the Royal Society sprung. There is record that he spent much of his income in helping indigent scholars, and he finally became so straitened in circumstances that Parliament granted him a small pension. He seems to have been a most benevolent and honorable character, and to have enjoyed the full confidence of his contemporaries. No less than twenty-two books are known to have been written by him, of which the one under consideration seems to have attracted nearly or quite the least attention. There seems to be no record that his desire to found an agricultural school ever came to tangible results; but it would not be strange if this little essay upon "Husbandry-Learning" should, after all, be the chief means of carrying Hartlib's name and life to future generations.

Cornell University.

L. H. Bailey.

Recent Publications.

Nature in a City Yard. By Charles M. Skinner. New York: The Century Co. 1897.

That any one who deliberately and avowedly writes about nature should be compared with Thoreau is inevitable. It is not surprising, therefore, that the publishers of this neat little book send out with it a slip in which some critic is reported as saying that one can get a good idea of Mr. Skinner's work by imagining Thoreau transported from his home in the woods to a densely populated city and compelled to substitute a Brooklyn back yard for his beloved Walden Pond. Mr. Skinner himself would smile at this comparison, for he does not pose as a poet or a mystic or a profound philosopher. He writes simply like a man of merry fancy with a keen habit of observing the surface of things. He makes no pretense of being an authority on entomology or botany or horticulture, and yet he says many interesting things about insects and their ways, and about plants and their cultivation. He makes no labored attempt to evolve a moral here and there or establish recondite analogies between the processes of the physical and spiritual universe. His essays, which are not without a delicate humor, ripple along in a stream of refined comment upon ordinary city sights and sounds, with nothing to mar their simplicity and grace except an occasional effort at fine writing. The book is neatly printed and has an attractive cover which will harmonize well with the furniture of a shady piazza on a summer afternoon, and the loiterer who picks it up for a half-hour's recreation will not be disappointed.

Notes.

Catawba grapes are still seen in some of the fancy-fruit stores and look as fresh as when gathered six months ago. A box holding three pounds sells for fifty cents.

During last week 5,242 barrels of pineapples came from Havana to this port. The entire output from Cuba will amount to from 100,000 to 125,000 barrels this season, about half the usual yearly export.

The New Hampshire Experiment Station finds that the varieties of potato which have received the highest commendation from all sections of that state are White Star, Rural New-Yorker No. 2, American Wonder, Carmen No. 3, Governor Rusk and Sir William.

More than one of the English horticultural papers have spoken this year of the good qualities of the white-flowered form of *Daphne Mezereum*, and a correspondent from Wellesley, Massachusetts, writes that it is strikingly handsome there this spring, having been in full flower a long time, and much more beautiful than the common one with magenta flowers. This plant ought to take high rank among our early-flowering shrubs.

Apples are still plentiful, 16,000 barrels having reached this city last week for the local trade, besides about 2,000 barrels for export. Northern Spy and Ben Davis bring the highest prices, with Baldwin, Roxbury Russet and Golden Russet in fair demand at somewhat lower rates. The receipts in New York city at this time last year amounted to 681,002 barrels, while in the exceptional season now ending 1,330,221 barrels have been sold here.

The third number of *Florilegium Harlemense* contains pictures of the light rose-colored single Hyacinth, Gigantea, a plant of unknown origin which appeared first some sixteen years ago; three single early Tulips, Chrysodora (yellow), Canary Bird (Kanarievogel), the white L'immaculée and the dark purple Wouwerman—all good varieties for forcing or outdoor planting; and the large and somewhat coarse Crown Imperial known as Maxima.

In regard to the complaint that Red Cedars grow slowly, a correspondent writes that some small trees planted at Radnor, near Philadelphia, some seven years ago, have grown in height considerably more than a foot every year, while some larger ones planted near have spread out rapidly into bushy specimens. It is to be noted that these trees were set in rich moist soil near water, and this indicates that the Red Cedar is not at all ungrateful for good treatment.

A series of lectures and field-meetings, for the purpose of supplying popular instruction about trees and shrubs which grow in New England, will be conducted at the Arnold Arboretum during May and June. The instruction will not be technical, and the purpose of Mr. J. G. Jack, who will conduct the lectures, is to indicate easy means of distinguishing the common native trees and shrubs and recognizing the foreign species which have been introduced. Applications and further inquiries should be addressed to Mr. J. G. Jack, Jamaica Plain, Massachusetts.

A correspondent of the April number of the *Orchid Review* writes of a specimen plant of *Dendrobium nobile* at Hollin Hall, near Bradford, England, which is carrying 1,134 fine flowers. Five years ago the plant was in an eight-inch pot, half-starved, and the bulb did not measure more than ten inches in height. It is now in a fourteen-inch basket, measuring three feet in diameter, and the longest bulbs are four feet six inches high. The success of Mr. Moorby, the gardener, is due to top-dressing every year with fresh sphagnum and peat, which keeps the compost fresh and sweet. Another important cultural point is the resting of the plants at the proper time by withholding the water gradually and never allowing them to shrivel.

The cold weather last week injured vegetables in Maryland and Virginia, and the asparagus, pea and bean crops were affected even in North Carolina. As the season for some sorts is waning in Florida, and these same kinds are not yet coming from the more northern Atlantic coast states in sufficient quantities, prices for new vegetables are high. For example, cucumbers, from Florida, sell at the rate of three for twenty-five cents; tomatoes, from the same state, at twenty-five cents a pound, and peas, the main supply from South Carolina and Georgia, with the first pickings from North Carolina, at seventy-five cents a half-peck. Asparagus costs forty to fifty cents a bunch. Even French artichokes cost more now than during winter, and bring thirty cents each. Bunches of a dozen or fifteen small carrots cost twenty-five cents; other young and tender vegetables are kohlrabi, beets and onions. Choice strawberries from North and South Carolina cost forty cents a box, and lower grades sell for twenty to twenty-five cents.

No lawn is quite as beautiful as one of fine grasses, but we agree with the *Rural New-Yorker* that a lawn of White Clover, pure and simple, is by no means unsightly, as any one can see by examining some of the little plots about the hotels in the

upper part of this city. This Clover will stand drought better than most kinds of Grass, especially than the Rhode Island Bent Grass or Blue Grass, and it can be readily and easily cut by the lawn-mower, but the point made by the *Rural New-Yorker* is that White Clover, being a leguminous plant, will take up the free nitrogen of the air and transfer it to the soil, and thus enrich it constantly in one of the elements of plant-food. It would be an interesting experiment to see how long a White Clover lawn would last if a little phosphoric acid and potash were applied to it every year.

A circular published by the Entomological Division of the Department of Agriculture, and just issued, describes the natural history and habits of the Strawberry weevil, which is very injurious to the staminate varieties of the Strawberry. The pistillate varieties, except such as furnish a considerable quantity of pollen, are not subject to attacks, because it is the pollen of the flower which furnishes the chief food-supply, both of the larvæ and the adults. This explains the preference of the insect for such varieties as Charles Downing, Sharpless, Wilson and the like. Crude carbolic acid, used in the proportion of one part to a hundred parts of water, if sprayed over the plants, is a good repellent. It does not kill the insect, but it makes the plant distasteful so that they will not feed on it. In the same way the Bordeaux mixture has proved somewhat useful by rendering the foliage disagreeable to the insects. It has also the advantage of being a fungicide and will therefore fulfill a double purpose in plants which are in danger of infection by the blight.

In a bulletin on apple-growing in New Jersey, prepared by Director Voorhees, of the Experiment Station of that state, the average value of the crop per acre throughout the state is set down as something like \$50.00, which shows that under ordinary conditions this crop is fairly remunerative. When orchards are managed with care and skill the returns are more satisfactory, and as an illustration of this Professor Voorhees cites the history of an orchard of thirty acres in Chester township, Burlington County. The soil, a sandy loam with a clayey subsoil sloping to the south-west, was carefully prepared before the stocky two-year-old trees were set in the autumn at a distance of thirty-three feet apart each way. The practice has been to seed the ground with Crimson Clover in July or August, to plow this under the next May, and then to cultivate the surface of the ground four or five times before seeding it again. A thousand pounds of an even mixture of ground bone and muriate of potash is applied broadcast every year before the clover seed is sown. The trees are pruned with tops well open to sun and air, and they are sprayed against insects and fungi. Under this treatment they bear annually fine crops of large perfect fruit, which is handled in the best manner, and the average of marketable apples for some years has been 130 barrels to the acre. The total annual expenses for each acre are \$45.00, the gross returns \$142.50, leaving a net return of \$97.50 an acre. The varieties grown are Williams' Early Red, Hagloe, Orange Pippin and Ben Davis.

Last month Sir John Gorst spoke at Girton on the question of education in rural England, and told his hearers that they could not successfully compete in agricultural products with Continental nations, who sent many things to England which ought to be grown at home. Denmark at the beginning of this century was one of the poorest countries in Europe, and to-day it is one of the richest, because Denmark supplies the English people in manufacturing towns, and even in country districts, with butter, eggs and bacon which Englishmen ought to produce themselves. The people of Denmark attribute their prosperity to the education received in the high schools, where every boy and girl is kept until fourteen years of age; besides this, there are winter and evening schools in that country where any one can study until he is thirty. Sir John also pointed out that the children in rural France were kept at school in the same way, and that, in addition to the money expended for general education, France devoted a million dollars a year to special teaching in agriculture and horticulture. Instruction in these arts, he said, was obligatory even in primary schools in the country, and all over France they had higher schools, schools of practice, and itinerant teachers and experimental plots at convenient distances, where demonstrations were given. There are more than 3,300 of these experimental gardens in France. Sir John thought it was a mistake to endeavor to fit country lads for third-class clerkships in the cities instead of fitting them for country pursuits, since the restoration of prosperity in the rural districts depends upon the intelligence of the country population which furnished the workers.

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School Gardens and School Grounds.

A FORTNIGHT ago we spoke of a leaflet sent out from the Cornell Experiment Station, which invited each of the school children of the state of New York to plant a little garden of Sweet Peas and China Asters. The circular contained brief instructions about selecting and preparing the ground, planting the seed and caring for the plants, and promised more complete directions to any who should make request for them. All this was done under a law of this state whose purpose is to broaden out the field of the experiment station and give it something of the character of the university extension work which is carried on now in various directions. A correspondent writes to inquire why the obvious plan of having a garden attached to every school has not been suggested instead of encouraging each child to have a garden of its own. In carrying out the plan of "nature study" in the schools it is argued that a school garden would always be ready to furnish material for investigation in botany and horticulture; it could be made of immediate practical benefit in setting forth some of the elementary principles of plant biology, and it would enable young people to see the reasons for many of the processes of horticulture and agriculture. No one would expect that a school garden would make expert cultivators, but with the aid of such an experimental plot many principles might be learned which lie at the foundation of the sciences upon which horticulture and agriculture rest. To show that is not an impracticable suggestion our correspondent points to the example of Europe where there are school gardens by the thousand, where many of the country schools have botanical museums, entomological collections and cabinets of minerals, and some of them beehives, for purposes of investigation. American children are as apt to learn as any in the world, and yet few of them can give the names of the trees and shrubs they find along the road to school, and fewer still know anything about our common insects and their habits, or the birds which are filling the air with melody these spring mornings.

All this is perfectly true, but before our children can be taught effectively in this direction we must first teach the teacher. Two or three months ago in an article on agri-

cultural education we cited the instance of a primary school in Belgium which was visited by a representative of the Association of American Colleges and Experiment Stations. When this visit was made, a class of boys and girls about twelve years old were listening to some instructions which were carried on with the help of simple chemical experiments and skillful questions within their comprehension, so as to stimulate their observation and broaden their knowledge. The particular subject of this lesson was milk, and it was reported that as the different members of the class summed up what they had listened to and seen and thought, it was evident that from this time forth their knowledge of milk, its composition and uses, was considerably wider than it would have been if they had never received the lesson. Around the walls of this schoolroom hung pictures of plants and agricultural implements, and adjoining the school was a small garden in which many kinds of plants were growing and in which different methods of cultivation were tried for the instruction of the pupils. The report went on to explain that this teacher was the secretary of the local horticultural society, and in this capacity he was helping in their business the fathers of the children whom he was instructing. No doubt, these children will be more inclined to avail themselves of the most approved methods of scientific agriculture than they would be without this special training, but this is not all. Their minds will be more thoroughly trained for practical use, and they will be stronger and more logical thinkers than they would have been without this instruction. If, therefore, these leaflets sent out by the Cornell Experiment Station lay the foundation for any systematic preparation of common-school teachers for giving practical lessons in the proper method of studying natural objects, they inaugurate one of the most promising ventures that have recently been undertaken in the field of education.

We should not counsel any teacher to wait before establishing a plant garden until he is as thorough a gardener as the Belgium teacher to whom we have alluded. Any one who is apt to teach and who has enough experience to grow common plants with average success can use a garden in connection with this nature study to good advantage. A mere book-man will fail, but a teacher who is competent to lead and direct his pupils in their personal investigations of the mysteries of nature could find abundant material for helpful illustration in a school garden. We have heard it objected that American schoolboys, out of mere wantonness, would destroy any planting of this kind; and it has been offered as a reason why school-grounds are not more generally beautified with trees and shrubs that the pupils would mutilate them. But, on the contrary, there is the strongest evidence to prove that wherever flowers and shrubs are planted on school-grounds, and the children are invited to aid in their cultivation, they soon acquire an affectionate interest in them, and not only refrain from injuring them, but take pride in protecting and developing them. Boys and girls need playgrounds even more than they need gardens, and the first adjunct to a school building ought to be some place where they can play games—a plot that will answer for an outdoor gymnasium. Few school-yards in the country, however, are so contracted that there is no room for vines or herbaceous plants along the walls of the schoolhouse, and in many places it is possible to have a real garden in which the children can take an active interest and feel a responsibility—a garden where they can learn lessons in order as well as in natural science, and acquire a habit of observing closely the beauties of structure and of adaptation in the different forms of vegetable life.

This is apart from the ordering of school-grounds with a primary view to their neatness and beauty. A large proportion of the children of the country spend many hours of the day for five days in the week in the schoolhouse or near it, and certainly if they live upon an unclean floor, with stained and battered ceilings and decrepit

furniture, the lesson they receive in taste and morals will not be the same as it would be if they were in a neat and tidy room with simple and cheerful decorations. If the grounds about the schoolhouse are bare and comfortless they would hardly suggest any refinement or elevation in the instruction within, and certainly grassy, shrub-bordered grounds with well-kept trees will have a more civilized look, and if the minds of the young are influenced by external objects, cleanly and beautiful surroundings ought to suggest orderly habits of life and thought. At all events, there is no reason why, in even the poorest neighborhoods, the grounds about schoolhouses should not be beautified by the shrubs and plants which can be obtained from the nearest wood. Where there is a will there is a way, and a dilapidated schoolhouse with an unshaded and repulsive yard means that the community lacks civilization, that it does not possess even the germs of refinement. School gardens, too, are possible wherever there are a cultivated and enterprising teacher and an intelligent community, and the time ought to be near at hand when a garden and window plants will be considered quite as essential articles of school equipment as maps and apparatus for experiments in the sciences.

DR. AUGUSTINE HENRY, of the Chinese Custom Service, in a personal letter from Mengtse, writes the conductor of this journal:

There is here a fair number of northerly forms, as *Fagus*, *Corylus* (one species each); of *Quercus*, perhaps twelve species. Coniferæ are few, two *Pinus*, an *Abies* and *Cryptomeria Japonica*. The flora seems very varied, with many genera. *Clematis* has, perhaps, fifteen to twenty species; *Lespedeza*, *Desmodium*, *Uraria*, many species. Characteristic Hupeh plants still occur—*Platycarya strobilacea*, *Buddleia*, several species; but only one *Acer*. I have just found an *Altingia*. But I cannot pretend to go into an account of the flora yet. I must have close on a thousand species in the six months' collecting. I wish I had nothing else to do but botanize, then I might hope to rival Delavay's three thousand species from western Yun-nan.

I have not been to any tremendous forest yet, though I was in one which must have been fifteen miles long. My native has just come back from a forest situated between here and Laohey, which he describes as full of immense trees and lots of big game—bear, wild pig, red deer, musk deer and panthers.

It is very curious to note how persistent the Chinese have been in deforesting their country. On the Red River in Tongking we saw much forest, but the moment we entered the Yun-nan part of the river, only grass hills and little shrubberies. Last month in Tongking, close to the Red River, a herd of wild elephants was discovered in the forest, and two were shot by the French officers. And I imagine elephants must have big forests to live in. So the best collecting ground is on the Yun-nan-Tongking frontier. I hope to set off soon on a trip of twenty days or so.

Second-growth White Pine in Pennsylvania.

FOREST CONDITIONS.—The valley along the Bear Creek, Pennsylvania, attracts attention by its marked tendency to reproduce the White Pine. The region is practically stripped of its forests and presents a familiar picture of desolation. Small and comparatively young groves are seen now and then scattered over the valley. The kinds of trees constituting these groves vary with the elevation of the valley; the lower portions are chiefly stocked with Hemlock and Spruces, and young White Pine and a few hardwoods are only seen on comparatively drier ground. The ridge land is covered with scrubby Oaks and other young hardwoods, among which the second-growth White Pine, Pitch Pine and the Pine seedlings are usually scattered. The comparatively high ground only seems to offer more favorable conditions for the natural renewal of the White Pine. The Pine on such portions rarely occurs in pure growth, and is usually mixed with Maple, Beech, a few Yellow Birch, White Birch, Hemlock and Spruce, scattering White Oak, Red Oak and occasional Black Cherry. The White Pine in such groves is imposing, even when found in comparatively small numbers, for with its greater height and well-

developed crowns it reaches above all the other sorts of trees and forms a canopy under which they find shelter. The soil is usually protected from the direct rays of the sun by the moderately dense undergrowth, consisting chiefly of young and very small Hemlock intermixed with the hardwoods already named, which are also young and small, under three inches in diameter at breast-height and from five to ten feet high. The soil, being well drained by Bear Creek and a number of other small streams, is kept fresh under the mold layer, which is usually thickly covered with leaves and a few Ferns.

ACRE-YIELD.—The process of regeneration of the White Pine may be fairly illustrated by the following acre-measurements procured from sites representing typical conditions of natural reforestation for the valley. One acre was staked off in a grove on a slope facing south-west. The grove was of hardwoods intermixed with White Pines. The undergrowth consisted of 280 small Hemlock, 146 small Beech, 84 small Maples and 12 small Yellow Birch and White Birch. The loamy sand soil was light, loose, deep, dark brown in color, of medium grain, and with pebbles and gravel intermixed. Of the 216 trees on the acre there were:

80 White Pine, from	6 to 23 inches in diameter at breast-height.
68 Maple, " 14 " 18 " " " " " "	
22 Beech, " 6 " 24 " " " " " "	
14 Yellow and White Birch, " 6 " 24 " " " " " "	
12 White and Red Oak, " 6 " 14 " " " " " "	
2 Black Cherry, " 10 " 14 " " " " " "	
18 Hemlock, " 6 " 14 " " " " " "	

The height of the White Pine averaged from 60 to 80 feet; the height of the hardwoods did not exceed 50 feet. The age of the White Pine ranged from sixty to eighty years. The volume of boles of the White Pine equaled 2,918 cubic feet, which means an average annual accretion of 41 cubic feet to the acre. Making an allowance of fifty per cent. for waste when the timber is ready for the axe, 250 feet, board measure, may be counted upon as the annual increment to the acre.

Another acre was staked off in a grove on a slope facing north-east. The grove was of White Pine, intermixed with hardwoods, with scattering Hemlock and Spruce. The undergrowth consisted of 200 small Hemlock, sixty-six small Beech, twenty-four small Maple and ten small Spruce. Soil, sandy loam of a reddish brown color, fine grain, medium loose, fresh, deep, with two to three inches of mold on top and a surface cover of abundant leaves, Laurel and a few Ferns. Of the 232 trees on the acre there were:

154 White Pine, from	3 to 23½ inches in diameter at breast-height.
36 Maple, " 6 " 14 " " " " " "	
18 Beech, " 6 " 14 " " " " " "	
16 Hemlock, " 6 " 10 " " " " " "	
8 Spruce, " 3 " 10 " " " " " "	

In height and age the trees on this acre were exactly comparable to those described above. The volume of boles of White Pine equaled 5,036 cubic feet, which gives an average annual accretion of 72 cubic feet, or 432 feet, board measure, when ready for the axe. It should be noticed that the density of crown cover* in both groves was very uneven and did not exceed from 0.5 to 0.7.

GROWTH.—The growth of the young White Pine shows irregularities in its progressive development. Side by side may be found internodes differing more than two feet in length. It is not unusual to measure consecutive internodes and find one from three to six inches, and the other from two to three feet long. The same is true when the annual rings are examined on the various cross-sections; rings three to five millimeters in width may be encircled by others with a width of one millimeter or less. The crowns of the Pine, though not lacking in development, show also a wide difference in their relative length with regard to the total height of the trees. In short, every individual Pine

* The degree of density is expressed in decimals, taking ten to represent a full cover impenetrable to sun rays.

bears evidence of the irregular and extreme conditions in the various periods of its life. It will not be unexpected, then, to find Pine trees of the same age in the valley differing widely in their dimensions. The average dimensions of trees of various ages given below, and based upon the measurements of fifteen trees, may, however, be taken as an indication of the rate of growth of the White Pine in Bear Creek Valley:

Description.	Age.	Diameter (breast-high).	Height of tree.	Height to base of crown.	Volume.		Remarks.
					Bole, cu. ft.	Merchantable timber, b. m.	
Young White Pine grove, mixed with mature Spruce, Hemlock and scattering hardwoods.	53	10½	52	19	16	65	{ Nine trees measured, from 47 to 64 years old.
Hardwoods intermixed with White Pine, Pitch Pine, Hemlock and occasional Spruce.	96	24	82	30	118	557	{ Four trees measured, from 92 to 98 years old.
Ridgeland densely covered with young hardwoods, among which White Pine and Pitch Pine are scattered.	126	30	87	27	167	791	{ Two trees measured of 123 and 128 years old.

From this table it is seen that the growth in height is here comparatively slow for the first fifty years, and much slower for the next seventy-five years, while the diameter for those same periods increases very rapidly, especially during the second fifty years. This is exactly what should be expected from Pine growing in half-open or entirely open groves.

Washington, D. C.

A. K. Mlodziansky.

Foreign Correspondence.

The Royal Horticultural Society.

THE extent, interest and variety of the plants shown at the last fortnightly meeting were such as one expects to see only at a large exhibition. The hall in which the meetings are held is not nearly large enough to accommodate all the plants now sent to these meetings, and the society will be compelled to place some limit on the number of plants sent by each exhibitor or else a larger hall must be found. The latter alternative is most desirable. It would be a pity to place any limit upon the exhibitors, especially as the quality of the exhibits is almost invariably of a high order. Certainly the result of the activity shown by the society during the last few years has been to make these fortnightly meetings both popular and useful. To be able to go to a centre where all the new and interesting plants can be seen growing is a great improvement upon having to get some idea of them from pictures and descriptions in the papers. The importance of these meetings as a help in the promotion of horticultural taste cannot easily be overrated.

Primulas and Auriculas were the special feature of this mid-April meeting, and they were as well represented and admirable as ever. The season has been a little backward for them, still the collections of show, alpine and fancy Auriculas were large and interesting, and it was a positive pleasure to go from group to group noting the charms of green edges, gray edges, white edges; the selfs and golden eyes among the alpines, many of them with the meal and color laid on with such mathematical accuracy as to look artificial. One must inspect these plants in such company as Mr. James Douglas, Mr. Sanders, the Rev. F. D. Horner and Mr. Turner to fully appreciate and understand their

points. There is no plant enthusiasm like that of the Auricula fancier. New varieties were awarded prizes and certificates, and altogether there was abundant evidence of the vitality of the Auricula cult. Daffodils were in as strong force as Auriculas, prizes being offered to collections, while in the numerous new hybrids and seedlings shown there was evidence here also that Narcissus has become an established favorite in English gardens, although our friends on the Continent see no beauty in these flowers. The Rev. G. H. Engleheart's collection of new seedlings and hybrids was of the greatest interest, several of them being of quite exceptional merit; one, called Red Prince, after the style of Nelsoni, with a large open cup of rich scarlet, and another named Beacon, of similar character, being considered by some competent judges as two of the most beautiful hybrids yet raised. They were awarded first-class certificates, as also was a new hybrid named Snowdrop, raised from *N. albicans* and *N. triandrus*. Mr. Engleheart says his work among the Daffodils is a source of the greatest delight, and one might add that such successes as he achieves ought to be a source of considerable profit also; for it has come to pass that fanciers of these plants will pay five, ten or twenty guineas for a single bulb of a new Daffodil. I should say the two new ones named above are each worth considerably more than the last-named sum. True gardening is, of course, done for love; at the same time the commercial side of the work has an importance which even our wealthiest amateurs nowadays do not overlook.

The Orchids were represented by an exceptionally large number of new and rare kinds, as well as specimens showing good cultivation. The most noteworthy, perhaps, was a hybrid raised by Messrs. Veitch & Sons from *Lælia Digbyana* and *Cattleya Trianae*, which resembles the hybrid raised some years ago by the same firm from this *Lælia* and *Cattleya Mossiae*, but it is darker in color and differs slightly in the form of the segments. It obtained a first-class certificate. *Zygopetalum Perrenondii superbum* is a larger-flowered and richer-colored variety than the type raised by Messrs. Veitch from *Z. Gautieri* and *Z. intermedium*. It was awarded a first-class certificate. Similar distinction was accorded to a very fine variety of *Odontoglossum Wilckeanum* named Empress-Queen, and shown by Baron Schroeder; it has large full flowers, heavily barred and spotted with red-brown on a bright yellow ground. Two other *Odontoglossums* obtained certificates, as also did a beautiful example of the old but now rarely seen *Dendrobium albo-sanguineum*. Large groups of Orchids from Messrs. Veitch, Sander, Low, Williams, Sir Trevor Lawrence, Baron Schroeder, Mr. Lucas and others were remarkable for the numerous beautifully grown examples they contained. *Epidendrum bicornutum*, as vigorous and well flowered as could be wished; *Dendrobium Brymerianum*, with thirty clusters of flowers; *Cymbidium Devonianum*, with four strong flower-spikes; *Cattleya citrina*, in great number and well flowered; *C. Shroederæ alba*, with fourteen beautiful flowers, and *Ansellia Africana*, with nine large spikes of pale yellow-brown barred flowers. When it is remembered that these plants, which are valuable and delicate, are brought long distances in treacherous weather and exposed to the unfavorable conditions of an ill-constructed hall, and all for love, no prizes of any kind being given, such displays speak much for the generous enthusiasm of the Orchid devotee.

Erythroniums are most useful plants for spring gardening, and some of them are quite worth growing in pots for the conservatory. *E. revolutum*, with ovate mottled leaves and scapes a foot high, bearing large rose-tinted flowers over two inches across, was awarded a first-class certificate. *Ornithogalum lacteum*, an old garden plant of last century, but still one of the best of the Cape species, was awarded a certificate under the name of *O. grandiflorum*. It has strap-shaped leaves a foot long and scapes two feet high, bearing dense racemes of white and yellow flowers,

each about two inches across. A variegated Potato, the leaves heavily and attractively variegated with creamy white, was awarded a certificate; we may therefore now include the Potato among decorative herbaceous plants. In effect it is not unlike a dwarf variegated Elder. Fuchsia Addington, shown by Messrs. H. Cannell & Sons, is a new hybrid between *F. fulgens* and *F. splendens*, with large pendent clusters of bright crimson flowers of distinctly decorative character; it was awarded a certificate.

Hippeastrums were exhibited by several specialists, and some of the new seedlings obtained certificates. Growers of these plants find it preferable to raise stock from seeds rather than depend on the same bulbs year after year, and as they mature seeds freely and, moreover, are easily crossed one with the other, one gets novelty and improvement as well as vigor in the seedlings thus obtained. The predominant influence of *H. aulicum* is a well-marked feature of all the large-flowered seedlings of *Hippeastrum* in cultivation to-day, while *H. equestre* and *H. reticulatum* are very much in evidence among the smaller forms. These plants are now being grown in large numbers in some tropical countries where the conditions are suitable, and the bulbs are sent to England to be sold by auction in the same way as *Lilium Harrisii*, from Bermuda, is. By the way, I notice that an enterprising planter in Natal has discovered that this Lily may be grown as a field crop there, and he has just sent over four thousand bulbs to be sold in London as an experiment. Yellow-spathed *Richardias* are, I am told, being farmed in the same way, so that before long we shall be able to buy tubers of these plants at as cheap a rate as *Tuberose*s. All the so-called new yellow *Richardias* that we have heard of lately are either *R. Elliottiana* or *R. Pentlandii*.

London.

W. Watson.

New or Little-known Plants.

Sambucus leiosperma.

IN our number of April 7th last a figure and short description were printed of the black-fruited Elder of the Rocky Mountains, *Sambucus melanocarpa*, and on page 175 of this issue appears the figure of the red-fruited Elder of the high Cascade Mountains, which Mr. John B. Leiberger has distinguished from *Sambucus racemosa* and recently described as *Sambucus leiosperma*.*

It is a stout shrub with spreading branches six or seven feet high, leaves composed of from five to seven nearly glabrous leaflets varying from oblong to lanceolate, acute or acuminate and sharply serrate, oblong, somewhat flattened cymes of yellowish white flowers and scarlet berries in which are from three to five smooth nutlets.

Sambucus leiosperma is the red-fruited Elder of the high mountains of Oregon and Washington, extending, according to Mr. Leiberger, northward to Alaska. Whether the character, the smoothness of the nutlets, by which it is proposed to distinguish *Sambucus leiosperma*, will prove constant, we have now no means of judging. The specimens collected near Crater Lake, Oregon, last summer by Mr. Leiberger and Dr. Coville, of the Department of Agriculture, are certainly very distinct, as appears in our figure. The red-fruited Elder, however, on the Oregon and Washington coast region, judging by a single specimen only, has the distinctly pitted nutlets of *Sambucus racemosa*.

Plant Notes.

TULIPA GREIGI AUREA.—All lovers of Tulips are familiar with the species introduced some years ago by Regel and named *Tulipa Greigi*. It is the most handsome and striking of wild Tulips, having light, glaucous spotted leaves, which are very ornamental, and bold flowers with large wavy petals. The form originally introduced was a brilliant salmon-red in color. Although a most desirable plant, *T. Greigi* is not apt to prove more than a transient

visitor in gardens unless cultivated under special conditions, and as, unlike most Tulips, it does not make surplus buds or offsets, we have until lately been dependent on seedlings for increase of stock. These seedlings usually show some variations in color in reds and yellows. Lately, large numbers of the bulbs have been collected in the Sir Darja region of Turkestan, and it is said that practically there are two types, the red one usually known and the yellow form lately introduced as variety *aurea*. The latter differs from the older type only in the color of the flowers, which may be feebly described as a singularly deep, glowing yellow, with red markings on the exterior of the petals and red blotches over black eyes on their bases within. We can think of no flower with a richer color than that of one of these Tulips, which was sent to this office last week by Mr. Gerard.

Tulipa Greigi bears every indication of being a vigorous plant, and its failure to become established in gardens is probably only owing to the unnatural conditions under which it is grown. On the steppes in which it occurs no rain falls, it is said, during five months. This indicates, of course, that the bulbs should be kept perfectly dry after flowering, and the simplest plan, evidently, is to lift them as the leaves die down and store them in a hot dry place till late in the year.

Cultural Department.

The Hippeastrums.—II.

SPECIES AND VARIETIES—CONTINUED.

HIPPEASTRUM stylosum, the salmon-colored *Amaryllis*, from Guiana and the valley of the Amazon, is an interesting species. It bears an umbel of from three to eight flowers of a bright salmon color. Although growing easily in a warm room, it deteriorates rapidly in the moist greenhouse in winter. I received a plant from Mr. Henry Pfister, head gardener of the Executive Mansion, Washington, to whom it had come from the Sandwich Islands under the name of *Amaryllis Honoluluensis*. Lately I have been informed that this species, together with *H. equestre*, is common in the gardens of Honolulu. It needs tropical treatment in summer, but in the greenhouse it must be kept in a dry warm place during the winter.

Hippeastrum solandræflorum, the Long-tubed *Amaryllis*, is another tropical species. It is a native of Venezuela, Guiana, northern Brazil, Colombia, Panama, Costa Rica and the Lesser Antilles. G. F. Appun, in his interesting work, *Unter den Tropen* (vol. i., p. 240), informs us that it is called "*Lirio*" in Venezuela, and that it grows abundantly on the dry southwestern slope of the coast Andes, where it is a great ornament when the rainy season begins. It flourishes in the open, treeless region among the grass. In cultivation its leaves grow to a height of from twenty-six to thirty inches, and the flower-scape is often more than a yard high, crowned with a magnificent umbel of from four to six long-tubed lily-like very fragrant flowers. The color varies very much, some flowers being milky white, others creamy, and still others almost pure white with red veinings and lines; the interior of the tube is green. In congenial soil and in a tropical climate the bulb grows to a large size, often five to six inches in diameter. Of the variety *H. conspicuum* I have received bulbs fifteen and sixteen inches in circumference. Through the kindness of Dr. A. Ernst, of Caracas, I came in possession of bulbs of the variety *Striatum*. The flowers of this form are exceedingly fragrant, and though more brilliant and conspicuous, their long-tubed shape reminds us of the *Lilium longiflorum*. The color of the blossoms is white, veined with dark crimson. The best of all the varieties is, without doubt, *Conspicuum*, which was introduced into cultivation in large quantities by Haage & Schmidt, of Erfurt, about fifteen years ago. A good picture of it appeared in Regel's *Gartenflora* (plates 949 and 956). The very symmetrical flowers, of which six to eight are borne on a strong scape, a meter high, are creamy white with a delicate rosy blush, veined and lined with purplish crimson. It grows vigorously in a warm atmosphere and develops its strong scapes of deliciously scented flowers before the leaves appear. None of these plants are easily kept in good health in the greenhouse. They really need stove temperature all the year round. In winter they must be placed in a warm, dry position in the stove, and should never be watered until the flower-scape has attained a height of three or four inches. In Herbert's time *H. solandræfolium* was used freely in cross-fertilization, but of late it has been

* *Proc. Biological Society of Washington*, xl., 40 (1897).

Fig. 20.—*Sambucus leiosperma*.—See page 174.

1. Flowering branch, natural size. 2. Fruiting branch, natural size. 3. Vertical section of flower, enlarged. 4. Fruit divided transversely, enlarged. 5. A nutlet, enlarged.

entirely abandoned in this respect. The *H. ambiguum*, which was sent from Lima, Peru, to the Glasgow Botanic Garden, and described subsequently by Dean Herbert as a new species, has been ascertained to be a cross between this species and *H. vittatum*.

Hippeastrum reticulatum, the autumn-flowering Amaryllis, I have been unable to obtain. It is said to be indigenous on the shores of Botafoga Bay, near Sao Domingos, Brazil. Its

variety *Striatifolium* is much more abundant and more beautiful than the type. Large specimen plants, consisting of many bulbs, are not rare in collections. The bulbs are small, short-necked, and the leaves, which are of a deep green color, are banded in the centre with a conspicuous creamy white stripe. Although I have had fair success with almost all my Amaryllis, this one I cannot induce to grow or flower, no matter how I treat it. In Missouri, where my plants were kept in a

room near the window, it grew without trouble. Nor can I succeed with the robust hybrids raised from it by Mr. B. S. Williams, of London, such as Mrs. Garfield, Mrs. William Lee, George Firth, Comte de Germiny, etc. My bulbs of the first two hybrids deteriorated, and I finally gave them to Mr. Pfister, who succeeded in the course of a few years in developing magnificent show specimens with them. All these plants flower in autumn, the scapes bearing umbels of from four to five flowers, varying from a bright rosy color to deep scarlet, conspicuously netted with a deeper red. These plants are evergreen, and watershould, therefore, never be withheld entirely. A writer in the *Gartenflora* recommends that all these species and hybrids should be placed in the stove when making their growth. "In winter, when at rest, they should not be watered at all, except when the leaves begin to shrivel, and they should be kept in a cool house until they begin to push up their young leaves."

Hippeastrum procerum (Amaryllis Rayneri), the Blue Amaryllis, Lily of the Empress, Imperial Amaryllis and Amaryllis Imperatrice, a singular Brazilian plant, departs widely from all other species of the genus, the bulb being large, stem-like, ovoid. The neck stands high above the ground, while all the bulbs of the other species are more or less deeply buried in the soil in their native haunts. The leaves, which hang down on the sides of the bulb, are bright green, edged narrowly with yellowish brown. They are two or three feet long. The flowers are blue. The species is found near Petropolis, from whence it was introduced to France, and flowered first in 1863. Mr. Lietze, the well-known botanical collector at Rio Janeiro, writes me that it grows on the mountain-sides in rather dry and sunny openings. My bulbs never flowered, and always perished after I had them a few years in cultivation. In *The Garden* (vol. xlv., p. 350) a fine plate was published, and your London correspondent, Mr. W. Watson, gave the following account: "According to Mr. Baker, as many as twelve flowers are produced in a single umbel, each flower being six inches long, but the Kew plants produced five and seven flowers, respectively. . . . The largest specimen has a stem-like neck two feet long, crowned with ten falcate leaves, and is a striking plant even when not in flower. The plant is evergreen under cultivation. . . . Cultivated in a pot it lives and grows slowly, but does not flower. Planted out in good loam, well drained, in a position where it will get plenty of light all the year round and in an intermediate temperature, it appears to be quite at home. I may add that in the same house and under the same treatment *Buphane disticha* and *Brunsvigia Josephinae* have flowered."

Hippeastrum rutilum, the Fiery Amaryllis, or Orange Lily, is a splendid species, and with its many varieties is one of the most valuable of the entire genus, since it grows easily and flowers profusely. It is a native of southern Brazil, where also the other varieties, varying in color from salmon, saffron, bright yellow and pale pink to a bright scarlet and fiery orange, are found. The typical species is a strong-growing plant with bright crimson flowers with a green keel extending half-way up the segments. The variety *H. rutilum fulgidum* (Amaryllis Brasiliensis), with bright scarlet flowers, is showier. Other beautiful varieties are *H. rutilum equestriforme* and *H. rutilum subbarbatum*, with umbels of brilliant orange-colored flowers, borne on scapes often three feet high. *H. rutilum crocatum* bears smaller saffron-colored flowers, while those of *H. rutilum citrinum* are bright yellow. *H. rutilum acuminatum* (*H. pulverulentum*) is a variety with pale pink flowers. One of the most strikingly colored varieties, *Ignescens*, with bright orange-scarlet flowers, has lately been introduced in large quantities by Mr. William Bull, of London. I still have most of these varieties, and all do very well, especially *Ignescens*. They all grow in southern Brazil in the deep black vegetable soil, and Dean Herbert's collector found *H. pulverulentum* in such soil with a scape three feet high and the leaves as long, and the variety *Equestriforme* was discovered by Mr. Herbert growing unperceived in a mass of parasitic plants, *Cereus* and *Pitcairnea*, which had been torn off from the face of a rock. In the rage for new plants which marks our time, these beautiful Amaryllis have been nearly forgotten, being at present rarely found in cultivation, though they are much more beautiful and valuable than the majority of plants now offered for sale. It is true they do not offer good material for the commercial florist, being slowly increased and flowering only once in the course of a year, but they are capital plants for the private flower cultivator and the amateur. This holds true of all the *Hippeastrum* species and varieties, and especially of the standard hybrids.

Hippeastrum pardinum, Spotted Amaryllis. This unique species is of comparatively recent introduction, having been

discovered in the Andes of Peru by Mr. Pearce in 1866, and sent to Messrs. Veitch & Sons, of Chelsea, where it flowered in 1867. It is so beautiful and so unlike anything else in the line of Amaryllis that it created a genuine sensation. The segments are broad, regular, of a creamy white or yellowish-green ground color, densely spotted and flushed with blood-red. The flowers are very short-tubed and the umbel always consists of two flowers. Not being a very strong grower it needs careful treatment. A number of different colored plates of this plant have been published, but the one that appeared in *The Botanical Magazine* (plate 564 and 565) is a correct representation of the wild species as introduced by Mr. Pearce. A fine form, with exceedingly broad segments of a bright greenish-yellow color, freckled with blood-red, was figured on plate 633 of *Flore des Serres*. Many very beautiful hybrids have been raised from this species, but most of them are difficult to grow. The type does not seem to be in cultivation at present; at least, all my specimens differ more or less from the plate in *The Botanical Magazine*. The exact locality where the first bulbs were collected in Peru is not known.

Hippeastrum Leopoldii, Leopold's Amaryllis, another noble species, was discovered by Mr. Pearce in the Andes of Peru and flowered by the Messrs. Veitch in 1869. It was correctly figured in plate 475 and 476 of *The Floral Magazine*, and all other illustrations are incorrect. This is really a glorious species, but I doubt whether the typical form is found to-day in cultivation, and, as in the case of *H. pardinum*, we are not acquainted with the locality where Mr. Pearce gathered his bulbs. The plant is of a robust constitution, two scapes being usually produced by one bulb, each carrying an umbel of two flowers. They are very large, widely open, short-tubed, with broad well-formed segments, which are white at the tip, bright red in the middle, with a bifid white keel in the lower half of the red, and a large greenish-white throat. The original bulbs have evidently been lost and their progeny differ in many particulars, though their form is the same. All the bulbs which have flowered with me vary more or less in the red color and lack the bifid white keel in the lower half of the red which makes the type so strikingly beautiful. Collectors in Peru should not overlook these two unique species. Since the introduction of *H. Leopoldii* a new era in Amaryllis hybridization has begun. All the best modern hybrids are of a robust habit and healthy growth, short-tubed, and show very broad segments. The common hybrids of *H. vittatum* which we find mostly in cultivation cannot compare in beauty with the kinds which have been obtained by using *H. Leopoldii* in cross-fertilization. The hybrids coming nearest to this species are John Heal and Hendersonii coccinea, but they are, unfortunately, rather difficult and slow in producing offsets.

Milwaukee, Wis.

H. Nehrling.

The Hardy Plant Border.

AMONG early spring-flowering alpine plants there is no more interesting genus than that of *Draba*. At this time, in the rock garden, there are several species in bloom, and although the flowers are small, the compact dwarf habit of the plants, which cling so closely to the ground in the pockets made among the rocks, makes them most interesting to lovers of modest plants. They are easily raised from seed sown in spring, and when they are large enough they may be planted out in the nursery for raising or testing hardy herbaceous plants early in May, and by the end of summer they make good-sized plants for transplanting to their permanent places in the rock garden. A good time to transplant them is about the end of August, so as they will be established in their new quarters before severe weather sets in. They grow best in a dry sunny position, and care ought to be taken that they are not planted where water will lodge around them in winter. Although they love a dry sunny place, yet they like a deep moist soil for their roots to penetrate. Last fall, when transplanting from the nursery beds a number of species of this genus, I was interested to know how deep some of their roots pierced the soil. By careful digging I found that they went down twelve and fifteen inches, although sometimes the part of the plant above ground was not more than one inch in height. This shows that they ought not to be planted in shallow pockets in the rock garden, but in places where their roots can get deep down into the earth away from the hot dry soil on the surface of the ground.

Draba brumæfolia is a lovely tufted dwarf plant with small linear ciliated acute leaves, and it bears pretty, small yellow flowers which are produced slightly above the foliage. This dwarf plant has been grown here for a number of years and is perfectly hardy. *D. borealis* grows close to the ground and

makes a nice green carpet, and its flower-stems are produced about four inches above the foliage. The color of the flowers is white. *D. stellata* also makes a good green carpet on the ground, but its flower-stems are six inches high, and has fairly good-sized white flowers. Other species in bloom now are *D. rupestris*, *D. hirta*, *D. lactea*, *D. confusa* and *D. arabisans*.

Near relatives of the *Drabas* are the *Aubrietias*, which clothe the ground thickly with their evergreen stems, and at this time they have a fine show of blue flowers. In a dry sunny position and partially rich soil they grow freely and are welcome additions to our garden at this season. The *Scurvy-grass*, *Cochlearia angelica*, is a dwarf British plant with white flowers, which are borne freely now. It grows and flowers well in a shady position. It is about six inches high and its stems are clothed with ovate leaves.

Viola Munbyana is one of the earliest of the hardy *Violets* to bloom here. It has flowers nearly as large as those of *V. cornuta* and of a deep purple-blue color. It has proved quite hardy here for two years, growing freely in a shady position and producing flowers in profusion. Another *Violet* in bloom, with pretty but small light purple flowers, is *V. sylvatica*, var. *Reichenbachiana*. The variety *cucullata* of *V. palmata* and its white form are also in bloom, and when they are grown in masses they are very effective, as their flowers are borne in such lavish profusion.

The first of the Leguminous plants to blossom is *Orobis Vernus*. This excellent, hardy, early-flowering plant, when the frost is out of the ground, grows so quickly that one is always surprised to see it in bloom so soon after it begins to grow. From its black roots rise healthy green leaves, and in a brief time they are almost hidden from view by blossoms of purple and blue. The flowers have red veins, and the keels are tinted with green and then change to blue. The plant is very easy to grow and it is quite happy either in the sun or when slightly shaded, and it enjoys a light rich soil.

In one of the borders some fine tufts of the lovely *Anemone Pulsatilla*, the Pasque flower, are producing their violet sub-erect flowers. The flowers are about the same size as those of *Adonis vernalis*, and are made up of six spreading silky sepals. The plant grows six inches high and its leaves are pinnate, and the segments many-parted. This lovely *Anemone* ought to be more common in gardens. It is quite happy here in a slightly shaded border and in rather stiff loamy soil. Large clumps of *Adonis vernalis* are grown along the front of the herbaceous border, and their big bright blossoms have been enjoyed for several weeks. When the plants are once established it is better not to disturb them too often. If there is occasion to remove them, this should be done with care and as much soil as possible should be taken with the roots.

The large, stately Crown Imperials are in full bloom now, and they are the tallest plants in the border at this time. *Fritillaria Meleagris* is also in bloom, and its drooping, curiously colored flowers are very interesting. Masses of the common Grape Hyacinth and its white variety are conspicuous in the front row, making a bright show of blue and white. They not only thrive in this climate, but they multiply in a sunny position and in a light, sandy soil. *Arabis albida*, one of the easiest plants to grow, never fails to give an abundant crop of white flowers. The *Erythroniums* are blossoming freely now, a large bed-planting of *E. albidum* being covered with white flowers. *E. grandiflorum*, a rarer plant with yellowish flowers produced singly or two or three flowers in a small raceme, is past its best. Another rare variety now in bloom is *E. dens-canis*, var. *Sibiricum*. It has flowers of a light chocolate color.

Harvard Botanic Garden, Cambridge, Mass.

R. Cameron.

Summer Pruning the Raspberry.

IN the spring of 1892 an experiment was started at the Wisconsin Agricultural Experiment Station to determine the effects of summer pruning upon the growth and fruiting of the Raspberry-plant. This experiment was continued through the season of 1895, but as a portion of the plants, in the mean time, were attacked by the disease known as curl-leaf, the results were not regarded as sufficiently conclusive for publication, and the work is to be repeated.

A few points were, however, clearly brought out in this experiment, one of which is the evidence that summer pruning tends to increase the number of canes, both in the Red and Black Raspberry. When the plants in the differently pruned rows were dug out in the spring of 1896 the crowns were noticeably different in the number of stumps whence canes had been cut off in the annual removal of the dead fruiting

branches, and in the thinning out of the young canes to a definite number. The stumps were more numerous in the pruned rows. In one series the canes had been pinched twice each season—that is, the primary shoot was pinched at the height of twelve to eighteen inches, and the lateral shoots that appeared later were pinched about twelve inches from the main stem. In these twice-pinched plants the increase in the number of stumps was marked. In the once-pinched plants the difference was manifest, but to a less degree.

The structure of the stem in the Raspberry and several allied plants is peculiar in the fact that the stems, while living over winter, die back each year after fruiting, nearly or quite to the crown, while new branches grow out each spring from the crown at the base of the stems of the preceding year, or very often from these stems, slightly above their juncture with the crown. In healthy plants the base of the dead cane is sloughed off from the living portion, which heals beneath the juncture. Since the young shoots have the nature of branches, either from the old stem or from the crown at its base, we might expect that pinching the tips of the growing shoots would stimulate the growth of new canes, as we know it stimulates branching of the canes above ground.

Since the number of young canes in cultivated plantations of the Raspberry is usually too large to permit the best development of the fruit, unless they are thinned out, it would seem that the wisdom of summer pruning may be questioned. In our experiment there was no positive evidence that the yield of fruit was increased in any case by summer pruning, while it was very clear that it was decreased by the twice-pinching process mentioned above.

The formation of gall-like excrescences on roots has been ascribed to excessive pruning. In this experiment the pruning appeared to have no direct influence upon the number or the size of the root excrescences, a few of which were found on the roots of certain plants in all of the rows.

University of Wisconsin.

E. S. Goff.

Plum-trees for Ornamental Plantings.

ALMOST any well-grown Plum-tree is ornamental, though those of American species are usually more so than the Japanese Plums, and much more so than the European Plums. I remember to have seen attention called to the desirable qualities of *Prunus Americana* in GARDEN AND FOREST, but *P. angustifolia*, *P. Watsoni*, *P. maritima* and several members of the *Hortulana* group have quite as much to recommend them. *Prunus angustifolia* is a more graceful plant than *P. Americana* and bears foliage of a fresher green, while *P. Watsoni* makes a good showing in thick shrubby borders. A Plum-tree in full blossom is one of the most charming touches in the spring landscape. I was especially struck by the beauty of these trees this spring during a visit to the Plum orchards of the Maryland peninsula. There the white drifts of Plum blossoms interspersed among the pink of the blooming Peach orchards introduce an element of almost dazzling beauty into the rural landscape. Plum-trees there are very commonly planted in farmyards near the dwelling-houses, where they certainly give a better effect than many of the sorry exotics left by the tree agent. Many of the views which one gets in eastern Maryland in Plum-blooming time suggest the paintings of Mr. Alfred Parsons, and give one a real appreciation of the Japanese love for Plum blossoms. The Japanese Plums, by the way, are especially beautiful in blossom, but are not so attractive in habit of growth. [The popular garden tree in Japan is *Prunus Mume*, an Apricot rather than a Plum, and probably not a native of Japan, but of Corea.—Ed.]

But while American Plums are all to be rated together as useful for ornamental planting, there are wide differences among the members of any group. This can be quickly marked among cultivated varieties. Of *Americanas*, *Cheney*, belonging to the *Nigra* section, is remarkably beautiful at blooming-time. Its blossoms are very large and abundant and have a beautiful rose-pink tinge approaching the characteristic tint of Peach blossoms. *Cheney* also remains in blossom longer than most varieties. In the *Hortulana* group *Sucker State* might be noted for special beauty at flowering-time. *Moreman* and all the varieties of its class, including *Wayland*, *Golden Beauty*, *Reed*, *Leptune* and *Garfield*, are not only magnificent in blossom but have a graceful, slender, drooping habit of growth which would mark them out for ornamental planting. Mr. Kerr's *Sophie* is a tree of the same form and bears an abundance of blossoms, which show a pretty and peculiar pink in the opening buds.

There are varieties of *Prunus Americana* with nicely doubled flowers if one must have something of that sort.

Seedlings of *Prunus angustifolia* and *P. Watsoni* are apt to sprout from the roots. This, of course, is objectionable, but if one selects named varieties for planting, as he should, they may be worked on stocks which do not sprout. Black knot is a drawback to the use of Plum-trees under some circumstances, but in most cases it can be so easily controlled that it ought not to prejudice planters against our beautiful but neglected Plum-trees.

University of Vermont.

F. A. Waugh.

Work of the Season.

SUMMER bedding plants will claim attention during the next month or six weeks, and the frequent and extreme changes in weather usual at this season call for judgment in setting out tender plants. In the latitude of New York and Philadelphia May 15th is early enough, and farther north this planting out should be delayed until somewhat later.

Among the earliest plants to be put out are young Carnations and Violets for next winter's supply of flowers; these in most instances have been prepared for the change by growing in a cold frame for a few weeks. Carnations and Violets require well-enriched soil and deep cultivation, though for field culture it is probably the safest plan only to use barnyard manure of good quality as a fertilizer. This should be worked into the ground during the previous fall. A plan successfully followed by many large growers is to plant on new ground each season, or, at least, to avoid planting on the same ground two consecutive seasons. Besides the ordinary advantages gained by rotation, the plants are less likely to contract disease from germs which are carried over in the soil and litter.

The hardier bedding plants—for example, Verbenas, Feverfew, Phlox Drummondii and others—are also in the best condition for sturdy growth if kept for some time in a cold frame. They are then in readiness to follow the early spring flowers, as Narcissi, Tulips and other bulbous flowering plants, Pansies and English Daisies.

Tender plants, such as Crotons, Acalyphas, Sanchezias, Coleus, Iresines and Alternantheras, can be handled to better advantage in the greenhouse as yet, and in any event should not be planted out until the ground has become quite warm. If checked by a chill it takes some time for these plants to recover. Cannas are also quite sensitive to cold, and make little headway if planted out too early; from May 10th to May 20th is early enough to set these plants in the open ground. Cannas require abundant manuring and watering. The multitude of new varieties of Cannas seems to crowd out some of the old favorites, such as *C. Ehmanii*, a noble species for large beds, and the flowers of which are not only large, but are the nearest approach to pink that we yet have among Cannas. This species is also well adapted for conservatory decoration, and flourishes better when kept growing all the year than when it is dried off during winter.

Old plants of *Bouvardia* which have flowered during the past winter, if planted out in the garden, will give a large quantity of flowers during the summer and prove useful for cutting. Plants of this character are more floriferous than young plants of the present season.

Begonias of the *semperflorens* type are among available bedding stock, and in some localities prove very satisfactory. They require an abundance of water during dry weather, as do all Begonias grown under these conditions. It is desirable to harden off Begonias in a cold frame previous to planting out, and plenty of light will insure a stocky growth.

A group of miscellaneous flowering and foliage plants can be made an attractive feature of the garden, and will also help to relieve the crowded condition of the conservatory. Among plants well suited for such use are the varieties of *Hibiscus sinensis*, *Abutilons* in variety, *Grevillea robusta*, *Phormiums*, *Ficus*, double Pomegranate, Oleanders and *Aralias*. All of these are admirable, but require a little care in grouping to avoid clashes of coloring.

In making flower-beds it is necessary in our climate to have the surface of the bed level or even depressed slightly in the centre for all moisture-loving plants. It is practically impossible to thoroughly water a bed that is mounded up in the way often practiced by amateur gardeners.

In the greenhouse the work is also likely to crowd at this season. Among the plants apt to need prompt attention are the young Roses in preparation for flowering next winter. It does not pay to neglect these and to allow them to become stunted, and they should therefore be shifted from two to three inch, or from three to four inch pots sufficiently early to avoid any check to their growth, for it may be two months before they can be planted out in the house.

Holmesburg, Pa.

W. H. Taplin.

Xerophyllum.—This beautiful plant is found in southern New Jersey and southward, and is in full flower early in June. Last year, while botanizing with Mrs. Treat, we suddenly came upon an acre or more of these plants growing stately and tall, with large racemes of crowded showy white flowers. These are borne on a simple and rather stout stem, from two to four feet high, which rises from a thick bulb-like base. The stem is thickly beset at the bottom with very long needle-shaped, rigid, recurving leaves, while above these are shorter leaves which at the top are reduced to bristle-like bracts. The name in Greek means arid leaves. The plant bears transplanting remarkably well. It is established in Mrs. Treat's garden, and flowers as freely as when growing wild.

Vineland, N. J.

M. Abbott.

Canna, America.—We have just had this *Canna* in flower, the third in Dammann's list of so-called "Orchid-flowering" Cannas. It has been something of a surprise to us, for in some way we had formed the notion that it was inferior to *Italia* and *Austria*. In our present opinion, however, it ranks above both. The foliage seems to be stronger and tougher, and is of a color much harder to get in Cannas. It is dark bronzy-red, with irregular and inconspicuous dashes of lighter greenish color. The flowering-stem is tall and strong, bearing a large spike of flowers of the form and size of *Italia*. They are, however, of a most rare and striking color, a sort of brilliant apricot-red faintly spotted with darker salmon. The centre is canary-yellow, marked with the apricot-red of the body color, very much after the pattern of *Austria* and *Burbank*, except that in *America* the centre is lighter-colored than the wings. The blossoms are richer in appearance than any of the earlier Orchid-flowering Cannas. They do not appear to be better in substance, though; and this seems likely to prevent the general use of all the *Canna flacida* crosses in outdoor bedding. If it were not for this flabby quality of their blossoms they would soon very largely supersede the French dwarf Cannas for all classes of ornamental work.

University of Vermont.

F. A. Waugh.

Correspondence.

The Red Cedar.

To the Editor of GARDEN AND FOREST:

Sir,—I remember well how I admired the spire-topped Red Cedars as they grew on the banks of the Hudson River between Albany and New York very many years ago. I came to Waukegan, Illinois, fifty-three years ago. The bluffs on the Lake shore were nearly covered with these trees and *Arbor Vitæ*, and the former were abundant on the banks of the inland lakes in Lake County. The large trees were cut down for posts by the few settlers as they bought their lands or preempted them. Although these Red Cedars are not of as good form as those on the Hudson, nor as those in Florida, I had hundreds of the young trees gathered and made belts and hedges of them. I set an example to my neighbors and Red Cedars were planted by thousands.

I did not build my dwelling-house in the nursery until 1851, and as it was exposed to the west winds I planted a circular belt of White Pines on the west and north sides, leaving ample room between the house and the belt. I planted an *Arbor Vitæ* hedge running west from the south-west corner of the house, and in 1853 I built a large frost-proof building west of the *Arbor Vitæ* hedge or belt. From the east end of the *Arbor Vitæ* hedge I planted a Red Cedar hedge, curving to the west as it ran southward. I had no trouble with the other belts; they stand there to-day, every tree living and answering the purpose for which they were planted. The Red Cedar hedge was a failure after eight years' growth, although I tried every way to make it a success. My other Red Cedar belts were abject failures, too.

Two nurserymen, each bought a forty-acre lot and carried on the nursery business here. They have both been dead for many years, and on each lot there is a neglected mass of trees taking care of themselves. On both there are the remains of a Red Cedar belt that has stood for over forty years, and here and there a tree remains alone, but not one to the rod has heart-wood enough for a common fence post. The old Red Cedar trees that made such excellent posts must have been very old, as the trees I have planted stood many years before forming heart-wood, and in using a lot of them for poles I found that the White Pine and Silver Maple poles of the same size endured longer than the Red Cedar poles.

Waukegan is as thickly planted with evergreens as any city I ever saw of its size. Thirty-five years ago a large majority

of these evergreens were Red Cedar. Now I cannot think of but one Red Cedar growing as an ornamental tree, and this is about six feet high.

Waukegan, Ills.

Robert Douglas.

Maple Sugar in Vermont.

To the Editor of GARDEN AND FOREST:

Sir,—Vermont makes considerably more maple sugar and syrup than any other state in the Union. The average sugar crop is about 15,000,000 pounds, besides syrup. The season just closed has been exceptionally favorable, and this, in conjunction with a marked revival of interest in sugar-making, has carried the figures for 1897 much above the average; how much cannot yet be told. Sugar-makers began tapping from March 24th to April 1st, according to locality. A few days of backward weather marked the early part of the season in northern towns, but everywhere a very heavy run was experienced, which lasted ten days or two weeks. The amount of sugar made from each tree seems to have been unusually large. Some sugar men report an average of from three to four pounds, or even more, from large orchards, but the average through the state is not so high.

The quality of the product is improved every year. This is the result of the improvement in methods of manufacture, which have been notable in recent years. This is also evidence of reviving interest among owners of sugar-trees. There are still a good many large sugar orchards in Vermont which are not worked, but their number decreases.

Prices this year have not been entirely satisfactory. The weakness of the market was partly due, perhaps, to the large crop harvested, but there is a general feeling that there was a still greater increase in the sales of adulterated articles, to the prejudice of pure sugar and syrup. Prices for sugar have varied greatly. Some fancy lots sold in retail markets early in the season as high as twenty cents a pound. Prices for large quantities ranged from five to eight cents, the wholesale price keeping pretty close to five cents. The buying price for syrup in Burlington has ranged from fifty to fifty-five cents, with the retail price anywhere from sixty to ninety cents. It is probable that, with the increased output of maple sugar and syrup, there will be more of both used in the state, and it may be hoped that the lower prices will enable people elsewhere, who do not usually have that pleasure, to enjoy for once some pure maple sweets.

University of Vermont.

F. A. Waugh.

Scymnus marginicollis.

To the Editor of GARDEN AND FOREST:

Sir,—Professor J. B. Smith, in his report on the enemies of the San José scale, just issued, describes the introduction of the beetle *Scymnus marginicollis* into New Jersey, but questions whether it will live so far north. It may be worth while to state that it occurs in New Mexico at Santa Fé, in the Transition Zone (collected by myself, determined by Mr. H. F. Wickham), so there is apparently no reason why it should not survive in New Jersey. It also occurs in the Upper Sonoran Zone, having been found by Mr. Wickham at Albuquerque. In Arizona Mr. Wickham found it at Seligman and Williams, the latter place having an altitude of 6,727 feet—only a few hundred feet lower than Santa Fé. In the same report Professor Smith refers to the fact that we do not know the original home of the San José scale. It may suffice now to state that from evidence lately obtained, which I shall set forth fully on another occasion, I am satisfied that it is a Japanese insect.

Mesilla, N. M.

T. D. A. Cockerell.

Recent Publications.

Lawns and Gardens. By N. Jönsson Rose. With Plans and Illustrations by the Author. G. P. Putnam's Sons. New York. 1897.

Mr. Rose is a practical gardener and he has prepared a treatise which will prove of genuine value to the large and increasing number of those who take a personal interest in their home grounds. It does not aim above the intelligence or æsthetic sense of the ordinary American citizen who has never given any thought to planting and to whom some of the profounder principles of garden-art make no convincing appeal. Beyond the field this book covers there lies a region where a more subtle art holds sway—an art whose examples can be analyzed, but an art which never

can be taught. Essays on ideal gardens and the philosophy of garden-art are lost upon the man of average taste who wants something tangible, something which he can understand and appreciate, something which he can take home and apply to the planting of his city lot or the grounds about his suburban residence. Mr. Rose has planned to give instruction on this level and he has carried out his project with consistent interest in a book of four hundred pages and nearly two hundred illustrations, which are invariably helpful, although many of them are lacking in refinement and show no great merit as works of art. After a chapter on the study of natural scenery the instructions begin at the bottom by explaining the use of the instruments used in surveying and leveling. Directions for planning grounds, especially those of moderate size, are given in the form of a few examples which can be easily understood, and the methods of grading and modeling the surface are illustrated. Then follow suggestions as to the grouping and massing of trees and shrubs, with notes on the placing of specimen plants and detached groups, directions for constructing flower-beds and borders, and such details as are ordinarily entrusted to a skilled head-gardener. The last part of the book, like other works of its class, is taken up with a description of the best trees, shrubs, herbaceous plants and climbers for use in various situations in our climate.

Of course, a handbook like this is not meant to take the place of a professional landscape-gardener. Indeed, the sphere of an artist of high creative faculty is entirely outside of the regulation practice here laid down, but, unfortunately, artists of the first rank in landscape-work are rare, and when a so-called landscape-gardener is employed the chances are that his studies will be devoted to the solution of the more obvious questions of detail which are treated in this work. One who recalls the country places with which he is familiar and makes a note of all those which have been treated in anything like a satisfactory manner, will be surprised to note how few they are. Any book, therefore, which gives in a plain way practical directions for treating grounds so as to make them convenient and for producing effects that will be pleasing and not wearisome, ought to be welcome, and we have no doubt that this beautifully printed book will prove helpful to many beginners who propose with some seriousness of purpose to study the garden possibilities which lie about their houses.

Notes.

A box of Purple Guigne cherries, from Vacaville, said to be the first to leave California this season, reached New York on Monday, consigned to Messrs. Joseph Hahn & Sons.

In a recent number of *The Journal of Commerce*, of this city, it is stated that a law has been enacted in Bolivia granting concessions in the rubber-producing districts to foreigners as well as natives. The trees which yield this material grow wild on immense tracts of government land in eastern Bolivia, and the industry has heretofore been developed in only a small part of this territory. Much of the rubber now in commerce comes from Brazil, where its production and exportation are restricted by law to citizens of that country.

Asparagus is now fully in season and is coming from Maryland, Delaware and New Jersey, besides the southern Atlantic states. The crop of Bermuda onions is said to be short this season, and besides 30,000 crates which arrived here last week only one or two large shipments are yet expected. New onions are now coming from New Orleans by the carload, but these are neither properly cured nor well packed. The season for onions from Egypt will begin in two or three weeks. New Florida potatoes are now quite plentiful. Crookneck squashes have been in market for the past fortnight and sell at the rate of three for twenty-five cents. Tiny young okra sells at \$1.00 a hundred. Small heads of cauliflower grown under glass on Long Island cost forty to fifty cents each. String beans, from Georgia, are succeeding the Florida crop, and peas come from North and South Carolina.

The abundant crop of fruits in this country last year is still indicated in the trade in dried fruits. Sun-dried and evapo-

rated apples are in demand, notwithstanding the continued supply of fresh apples, and last week the available stock of evaporated apples not held back in cold storage in this city was not sufficient to supply the home and export trade, and prices for the grade rated as prime advanced a quarter cent a pound. During the corresponding term last year 139,888 cases of evaporated apples were sold in New York, and in the present season 415,580 cases, or nearly three times the quantity. Dried small fruits are nearly all closed out, excepting raspberries, but California peaches, apricots and prunes still sell readily at fair prices. The exports of all kinds of evaporated and dried fruits from this port since September 1st amount to 654,053 packages.

Strawberries became more plentiful during last week, and besides the last of the crop from South Carolina, crates and refrigerators of this fruit were forwarded by freight and express from North Carolina and Virginia. On Saturday firm, well-ripened berries of good size and flavor sold for twenty-five cents a quart box. In some of the fancy-fruit stores hot-house strawberries are still on sale, and no more perfect and beautiful specimens of this fruit have ever been seen here. Cups which hold a third of a quart sell for \$1.50. Maple sugar is offered in the fancy-fruit stores in two-pound bricks, the darker product here costing twenty-five cents and the more highly clarified, thirty cents. Almeria grapes, carried over in cold storage, and useful in making up fruit-baskets for travelers, sell for fifty cents a pound. The grape-fruit now offered comes from California and costs from ten to twenty-five cents each. Navel oranges, from the same state, sell for sixty cents, and the fancy King of Siam oranges for \$1.50 a dozen.

A law was enacted at the last session of the Massachusetts Legislature authorizing townships to elect wardens who shall have full care and control of the public shade trees of the town. This officer is to supervise the setting out of trees and their removal, if in his judgment it is for the best interest of the public that any should be removed, and he enters and prosecutes complaints for injuries to public shade trees. Under this act, Mr. James Lawrence has been elected tree warden of Groton, and we have received a copy of a handbill which he has ordered to be posted on all schoolhouses and other public places throughout the township. This notice contains the law under which the warden was elected and enumerates his powers and duties; it contains also a summary of the statutes of the state which prohibit the cutting down or injury of trees along the streets or public roads of the town. These laws are good ones, and if they are only enforced as they should be the street trees of the town will be reasonably safe. The example of Groton and its tree warden is to be commended to the other towns of Massachusetts.

In the winter palace at St. Petersburg is the Nicholas Salon, which is decorated with seventy-two Palms, averaging from twenty-five to thirty feet high. These stand in six rows of twelve plants each, and around each plant-tub is constructed a table at which ten persons can be comfortably seated at dinner. The Palms stand so far apart that their spreading tops do not touch, and the outline of each can be seen to advantage. The skill of the court gardener is shown in the fact that these tubs are only thirty inches in diameter, and they cannot be enlarged, owing to the limited size of the table. As the Palms remain in the palace from January until May, they lose seven or eight leaves every year which must be replaced by as many new ones before the following January. To bring about this growth the plants are turned out of the tubs as soon as they are taken from the palace, the roots are severely shortened with an axe, and the ball is re-tubbed in turfy loam, fertilized with bone-meal, and the Palms are then placed on a warm bed in the Palm-house. Here they remain until their new leaves are developed, and at New Year's they are transported to the palace, well packed in thick coverlets as they are carried through a temperature which sometimes falls to forty degrees below zero.

Among low trailing shrubs suitable for the rock garden there is none more beautiful than the alpine *Daphne Cneorum*, which is found on the calcareous soil in the Jura and southern Alps as well as in Hungary and Transylvania. In its home it is often called the Pearl of the Mountains, and its close clusters of delicately scented rose-colored flowers are now at their best. It is an old plant in gardens, and we call attention to it every year, but its beauty cannot be too highly praised. The roots are fine and thread-like, which shows that they like to wander in deep light soil. The plant is evergreen, and it often burns in the winter. It will not endure thick covering, however, but a light sprinkling of straw, which allows a circu-

lation of air, is highly beneficial. In our mention of this plant in spring we never can refrain from associating with it the hardy Candytufts, which are also trailing sub-shrubs. These are perfectly hardy, and when once established they will endure for many years, and, although the new growth may be killed back in winter, they always start early in spring, and at the extremity of each branch they bear a cluster of dazzling white flowers. The two plants, owing to the marked contrast in the color of their flowers, always look well together, and just now they are both unusually full of bloom.

In some notes on Breeding Tomatoes, contained in a recent bulletin issued by the New Hampshire Agricultural College, the point is made that the Tomato plant is quickly susceptible to careful selection, and that in selecting seed the plant, as a whole, has a stronger hereditary influence than the character of the individual fruit—that is, nothing can be gained in earliness, for example, by selecting seeds from the first ripe fruits, regardless of the general character of the plant from which they come. The same rule holds in regard to the production of new varieties by crossing, so that the more uniform and persistent the parent plants the greater is the chance that their characteristics will be transmitted. When once a desirable variety is obtained it can be kept only by constant selection. Varieties, as a rule, have been short-lived, chiefly because no care has been taken in selecting seed. Poor soils and insufficient cultivation tend to cause a variety to revert. Hybridizing between the large varieties and the clustered or currant-fruited kinds usually results in fruit intermediate in size, and crosses between the potato-leaved varieties and the common-leaved varieties usually result in intermediate foliage. As varieties mix readily when grown in the same field, pure seed can only be assured by selecting from isolated varieties. Rotation is a necessity, and plants grown on the same land from year to year, although highly fertilized, will degenerate in time. Haphazard crossing is of little value, and in order to attain any proposed ideal one must be particularly acquainted with the parent sorts and have clearly defined plans of procedure. When the parents are of a very different character the offspring is likely to be weak, while a cross between closely related species or races is likely to be vigorous. One characteristic of great importance in the Tomato has been too general neglect in producing new strains, and that is the keeping quality which varies widely among different varieties. Experiments at the Cornell Station seem to show that the solid varieties may not be the best keepers.

Like many of the preceding bulletins relating to vegetables, which have been issued by the Rhode Island Experiment Station, the one just issued on Celery is an admirable little tract which will give delight to every cultivator of this plant. No known substitute can take the place of Celery among vegetables, and no cooking or other process can make the blanched and tender stalks more delightful than they are when they leave the skilled grower's hands. Celery needs abundant water, rich soil, and, as the experiments at Kingston seem to show conclusively, it needs especially cool soil about the roots. This may be one reason why the old trench system has never been superseded, for under it the roots are shaded, and when they are properly cooled the diseases known as black heart and blight have no terrors. Seaweed, when spread two inches thick about the plants, is found to be an excellent mulch both for the preservation of water and the cooling of the soil. There is an excellent account of varieties, old and new, and Giant Pascal is said to be, like the Marshall Strawberry, too good for market purposes. The first American booklet on Celery-culture seems to have been written by M. Roëssle, landlord of the Delavan Hotel, in Albany. It was Peter Henderson who first advocated, between 1850-60, the change from the trench system to the surface-growing plan, and the development of Celery-culture as a branch of industry has been due more to his writings than to those of any other one person. After the simplification of Celery-culture by growing the plants on the surface the next great advance appeared between 1885-90 in the use of boards instead of earth for blanching, a practice which followed close upon the introduction of the self-blanching varieties. The White Plume is a seedling from an American sport which was introduced in 1884. Paris Golden originated in the garden of Monsieur Chemin, near Paris, at about the same time. In what is known as the new culture, Celery-plants are set from eight to twelve inches apart each way in beds, and when skillfully managed under high cultivation very large yields are secured. Three or four times as many plants are grown to the acre as under the ordinary system, but if the beds are neglected even for a few hours great loss is certain.

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Agricultural Education in New York.

THE Experiment Station Extension Law, usually called the Nixon Bill, under which the foundation has been laid of what promises to become an established system of agricultural education in the state of New York, was originally enacted in the interest of the grape growers of Chautauqua County. These men four years ago asked Professor Bailey, as the horticulturist of Cornell Experiment Station, to help them in fertilizing and caring for their vineyards. Of course, he could not undertake to supply expensive plant-food for any one section of the state, for, even if he had sufficient funds at command, other sections would make similar application. The station, however, offered to supervise any experiments which the local horticultural society might undertake, and later on Mr. Lodeman went into the district and outlined some experimental work to be carried on. The people became so thoroughly interested in this work that they made application to the Legislature for a small grant of money to be used for prosecuting it in Chautauqua County vineyards. It was evident, however, that this work, if useful at all, ought to be undertaken on a wider scale, and therefore a grant was made applicable to the Fifth Judicial Department of the state, which included sixteen counties in western New York. A sum of \$8,000 was given to the station to be used "in conducting investigations and experiments in horticulture; discovering and remedying diseases of plants, vines and fruit-trees; in ascertaining the best means for fertilizing vineyards, fruit and garden plantations; in disseminating horticultural knowledge, and in preparing and printing for free distribution the results of such investigation, with such other information as may be deemed profitable in promoting the horticultural interests of the state."

This grant, requested by people of the Legislature of the state, was the first instance, so far as we know, where a farming community definitely demanded the means of extending experimental and scientific knowledge in agriculture; and although the promoters of the scheme did not, perhaps, see its ultimate meaning, it marked a long step forward. In the absence of the Director of the Station, Professor Roberts, and of his assistant, Mr. Lodeman, the responsibility of outlining and carrying this new

work rested entirely upon Professor Bailey, who had no precedents to guide him in using the money. The first year's work was mainly preparatory and was spent in the effort to find out what people needed and what they wanted. Many meetings were held and bulletins published, and at the end of the year a definite conception had been formed of what could be accomplished. This was in 1894, and Professor Bailey estimates that the actual travel in western New York, in pursuance of this bill, was something like 20,000 miles. In the winter of 1895 the people requested the Legislature to increase the grant to \$16,000, which was at once acceded to. This year the work was extended, and a special study was made to determine the actual economic status of the farmer and the remedies for his needs. Besides this inquiry, new experimental work was laid out, many meetings were held, short-session horticultural schools were established in various towns and many more bulletins were published.

In January of 1896 the Legislature was again asked for \$16,000, and the appropriation was granted with great unanimity. The marked feature of the enterprise this year was an effort to apply the stimulus of a distinct educational motive to rural communities—that is, to arouse farmers to an appreciation of what had become an evident truth, that education is the real cure of the trouble and distress in our agricultural communities. The work of Professor Bailey and his assistants, together with their bulletins, had proved that the people need teaching more than they need experimenting, and the work was extended to the rural schools. Here was another new departure, and Professor Bailey testifies that of all the work he has ever undertaken nothing has ever inspired him or his assistants with such enthusiasm, and when they visited rural schools and began to interest teachers and pupils in the common objects about them the awakening of their mental activity was an unfeeling surprise. If there is to be any revival, any beginning of new life to agriculture, here is where it must originate. The best work now going on, therefore, is the endeavor to interest teachers of public schools in nature study, and it is gratifying to learn that the leaflets, of which we have heretofore spoken and which are novel of their kind, have been received with the greatest favor throughout the state, and, indeed, everywhere else. This idea of carrying the study of nature directly into rural communities is the most promising development in the field of agriculture since the experiment stations were established. In January of the present year the people again went to the Legislature and a distinctly new bill was passed. Hitherto the money had been granted to a portion of the state and in the interest of horticulture only. Now the demand came for a bill to apply to the entire state and to the whole field of agriculture, and \$25,000 was asked to begin the work. This, too, was plainly a popular movement, and it passed without any opposition. The work now naturally falls into the hands of the Director of the Station, Professor Roberts, who has had a general supervisory direction of it after the first year. While it was limited to the field of horticulture under the original Nixon Bill, forty-nine bulletins were issued, and the farmers of the state seem to be awakened to avail themselves of the power to bring the agricultural college into direct communication with the rural communities. They show their appreciation of the situation by their demands before the Legislature, and the strength and sincerity of their desire is proved by the readiness with which the Legislature accedes to their petitions.

From time to time we have spoken of this movement as its various phases developed. We have given some account of the itinerant or local experiment work of the expository bulletins as distinct from those which record strictly scientific work, of the striking success of the horticultural schools, and especially of the observation lessons which have been uniformly one of the school exercises. In these observation lessons some small object or part of a plant, like leaves or roots, or flowers or seeds, are put into the hands of all the audience, and after a short

time is allowed for examination they are questioned by the instructor until they realize how much there is to be learned by a careful examination of any natural object and how to use their faculties in the way of discovery. We have also spoken of the elementary instruction in rural schools which has been encouraged by the leaflets recently devised, and we may add now that one of the latest plans is a course of reading which has been devised in such a way as to compel the readers to think. About sixteen hundred persons are now reading systematically, although the plan is but a few months old. The station officers specify certain bulletins which are to be read, and then they ask the readers questions upon them, and in this way they are compelled to do some thinking, whether they wish to or not. Subjects within the farmers' comprehension are always selected. The first subject of study was the soil, and two bulletins were prepared, one on its texture and the other on the moisture it contained, and readers were requested to note anything upon which they needed more light or any statement which they wished to challenge, and were invited to send their queries and opinions to the station after they had thought them over carefully. But, not content with this, specific inquiries were addressed to every reader on both of these subjects, and the questions were so searching that no one could reply to them without some active use of his faculties.

Bulletin 122, published last December, the second annual report of this extension work, describes with considerable detail this experiment, for, of course, it is still an experiment. Nevertheless, every advance has been made with such caution and foresight that one cannot help feeling confident that the scheme, taken altogether, has expanded on most efficient lines. The recommendations in the concluding paragraph will commend themselves to every one. The several agencies which we have named should all be under the direction of a single bureau, removed from partisan influence, and associated with the original investigations in agriculture. This bureau ought to have an intimate connection with the Department of Public Instruction, so as to reach teachers, and through them the schools. Teachers in normal schools should be trained by experts in rural subjects. At the conclusion of this bulletin Professor Bailey notes as a matter to be thought of with astonishment how scant and poor has been the teaching hitherto which has had even a remote relation to the tilling of the soil. Many of our rural books do not seem to have been born of any real sympathy with the farmer or any just appreciation of his environment. It is a significant fact that the farmers of this state, as a whole, have proved themselves willing and anxious to be educated. They are difficult to reach, not because they are unwilling to learn, but because they have not been well taught.

We have received another letter from Dr. Augustine Henry, of the Chinese Customs Service, in which he mentions a remarkable excursion into the basin of the Red River in China. No doubt, Dr. Henry will, at some future time, give a more complete narrative of this tour through an unknown country, and publish the details of his discoveries. This brief account of the journey, however, is so interesting that we present it to our readers:

I have just returned from an exceedingly interesting trip to the country south of the Red River, in a district ruled over by an hereditary chief, who received me with great kindness. I reached the great range separating the Red River basin from the Black River basin, densely wooded with very large trees (average twenty feet in circumference at six feet from the ground), and toward the ridge, where the trees cease, an impenetrable Bamboo jungle, so that the range is only to be crossed at distant points by passes. The range averages 8,000 feet to 10,000 feet high. As this is the dead-point of the year as regards vegetable life, there was not much out in flower, but I found a magnificent *Rhododendron*, a *Magnolia*, two or three *Camellias*, *Stuartia*, *Daphne* (*Indica*?), a shrub with deliciously scented white flowers, an alpine

Primula, two or three *Clematis*, an *Evonymus* with remarkably durable and strong wood, occurring on the range. Two or three large *Aralias* (or kindred genus) occur right up to the summit. A very common tree was the *Tetracentron Sinense*, Oliver. This tree is very large, indeed, but the wood is not esteemed. Its fruit-spikes were lying scattered all over the forests, and most of the seed fallen. However, I secured a few seeds, which I enclose in this note. The tree is of interest from its position in the family *Trochodendraceæ*.

I spent two days on the Red River, where a tropical vegetation exists, and I found the *Tomato* and *Carica papaya* naturalized and growing abundantly. I found some interesting plants there also. The most marked peculiarity is the bizarreness of the fruits. One tree has pods two or three feet long clothed with a dense covering of brown hair, like the tail of an animal. The *Tamarind*, *Raphis*, the *Banana* were all there in the wild state. I forgot to mention that immense evergreen Oaks occur in the mountain forests.

However, the most interesting point of the journey was the aborigines. In the chief's district, say, a region twenty miles square, in addition to Chinese settlers, no less than seven distinct tribes dwell—distinct, that is, in physiognomy—with language mutually unintelligible, never intermarrying and having little or no social intercourse with each other, and possibly existing in this state for centuries. I collected vocabularies of their speeches, and they divide into three groups—*Lolo*, *Meatze* and *Shan*. The languages are all of the Chinese type, monosyllabic—that is, non-inflectional, with tones—and the peoples are Mongolic; but behind their Mongolian origin is strong evidence of two other stocks: (a) a pigmy and ex-primitive race, and (b) a negro element, characterized by the receding forehead and thick lips and occasional woolly hair. One people has extremely swarthy skins.

I found the *Lolos* proper in possession of a written character, in daily use, which seems to be an offshoot from very ancient Chinese (A. D. 1).

So you see how interesting, from many points, this region is. Great red deer and large and small bears occur in the forest, as evidenced by their numerous tracks, and many of the trees were marked by the claws of the smaller bear, who builds a kind of nest in the trees to sleep in.

John Evans and his Garden.

FEW persons of the present generation know of the existence of a neglected garden ten miles west of Philadelphia, which in the early days rivaled the gardens of John Bartram at Kingsess, and of Humphrey Marshall at Marshallton. Since the reawakened interest in Bartram's garden, it is surprising that the garden of John Evans should so completely be lost sight of. Situated in a beautiful country devoted to farming and summer residences of rich Philadelphians, and about three-quarters of a mile from Wootton, the celebrated demesne of the late George W. Childs in the famous Welsh Tract, it is still a charming place to visit, although its glory has departed.

John Evans was born in Radnor township, Delaware County, February 13th, 1790, and died on the 15th of April, 1862. He was the son of David and Adah Evans. On the paternal side his ancestors were thoroughly Welsh, while on that of his mother they were partly so. His early education was limited, though he received rather more than was usual at that time. There was a mill on the paternal estate, but he preferred going to a larger establishment to learn the business of milling, and after he had learned it thoroughly he was employed as manager of a larger flour mill, then (1812) recently erected near the present city of Troy, New York.

After his return from Troy he resumed the milling business at the homestead mill, and in 1819 married Ann, the daughter of Benjamin Brown, of Radnor, by whom he had six children. He subsequently engaged in the business of sawing lumber for the Philadelphia market.

Up to about the year 1827 or 1828, John Evans had not shown a great preference for any particular branch of science. About this time he received a visit from his kinsman, Alan W. Corson, of Plymouth, Montgomery County, who had with him a copy of Dr. William Darlington's *Florula Cestrica*, then lately published, and he became from that day an ardent botanist. His kinsman, Corson, and he

took frequent excursions together into the woods and fields. Annual or more frequent visits were paid to the old Bartram botanic garden—then in the possession of Colonel Carr—and to other gardens in the vicinity of Philadelphia. He gathered everything interesting and rare to transplant until the supply from this source was exhausted, when he turned his attention to Europe and entered into correspondence with Sir William J. Hooker, director of the garden at Kew, and by forwarding to that learned botanist annually for many years seeds and specimens of American plants, frequently obtained by long journeys and much labor, he received in return new and often rare plants from various parts of the world, scarcely obtainable from any other source by purchase. During part of the period occupied by this correspondence, Dr. Joseph Hooker, the son of Sir William, made a botanical tour to the Himalaya Mountains, in Asia. Seeds from that almost unexplored region, many of them produced by unknown plants, were forwarded to John Evans, who bestowed a great amount of care and labor upon the propagation of plants from these seeds. He also had a correspondent in Germany.

The premises of John Evans afforded no suitable grounds for an extensive garden specially designed for show and ornament, and yet it is doubtful whether another spot of the same extent contained a greater variety of plants of every habit, and every plant was found in the best place for its propagation and growth.* On the densely wooded hillside along the mill-race, north of the dwelling, were found magnificent Rhododendrons and other mountain plants, natives of the Himalayas, the Rocky Mountains, the Adirondacks, the Catskills and the Alleghanies, growing side by side in shaded seclusion, and moistened by the spray from the adjacent cascade of the mill-pond. Below, upon a flat on the opposite side of Ithan Creek, was an arenaceous alluvial deposit. Here was found the well-known "sand garden" of John Evans, and clustered within it a great number of species from New Jersey and many strangers from similar soil in more remote regions. The arid, rocky hills were covered with Pines and other conifers. The damp, shaded ravine had its Canebrake, the artificial pond its odoriferous Water-lilies and other aquatics, and every border and every corner were occupied by appropriate specimens brought together from remote parts of the earth. A large proportion of the labor required for the care and cultivation of this great collection was performed by the hands of its owner. The sawdust from his mill was used extensively around the growing plants to smother weeds. This soon decayed into a rich mold that promoted the growth of the plant.

The extent of the Evans collection is not accurately known, as no catalogue was ever published. In the number of distinct species of trees and shrubs it was doubtless unrivaled in his day, while in herbaceous plants it had few equals.

The garden at the present day is in a good state of preservation, although many changes have been wrought in the buildings and their surroundings. The mill has been torn down and the house altered to suit the tastes of the present owner. A splendid specimen of *Cephalotaxus Fortunei* stands back of the house along the mill-race, associated with several large Box-trees and Yews. A well-grown *Cryptomeria* also attests to the variety of arborescent species in former days. *Daphne Mezereum* is abundant as an undershrub in some parts of the wooded tract, while the Periwinkle (*Vinca*) covers the ground in many places. An interesting variety of the English Ivy growing against a stone wall along the driveway leading up to the house is peculiar in that the terminal leaders have an upright, independent habit with triangular or deltoid leaves, and provided abundantly with fruit. Several *Magnolias* on the lawn are of good size. The *Rhododendron* thicket in the woods back of the house along the mill-race is still in good

preservation, although when a visit was paid to the garden it was too early to judge of the botanical richness of the species. Nothing remains to indicate the location of the "sand garden" except one or two specimens of *Yucca filamentosa*. That the garden was formerly rich in species is proven by the fact that in the herbarium of the University of Pennsylvania many specimens from the garden are preserved, showing the former richness of its flora fostered by the hands of John Evans.

With John Bartram and Humphrey Marshall, John Evans completes a trio of self-taught botanists, all born within the limits of old Chester County, Pennsylvania, and the first within the present county of Delaware, which was partitioned off from the original Chester County. They were men of like tastes and were alike in their industrious and frugal habits. They were all men of the strictest integrity and highest moral worth, and especially were they devoted students of the vegetable kingdom. Each reared his own monument in the large collection of growing plants he left behind him.

University of Pennsylvania.

John W. Harshberger.

Three West-American Conifers.

SEVERAL so-called marked varieties of our western conifers, I am convinced, are entitled to take rank as species. Crowding two or more marked forms into one polymorphous group, while it emphasizes the fact that they are related, gives us little other knowledge of them. We know in this age of the world that all groups of plants are connected, more or less closely, and we believe that they are all derived from a few simple, primordial forms. As we meet with the termini of these lines of development we find them greatly diversified while also retaining vestiges of kinship. We advance knowledge of these lines—these genera and species—more by detecting and separating than by ignoring and generalizing.

Prevalence of the following forms over large forest areas, combined with many conspicuous differences, both in habitat and structure, demands, in my opinion, this long-delayed recognition.

PINUS SCOPULORUM, nom. nov.*—Rocky Mountain Yellow Pine. Small trees, rarely exceeding a hundred feet in height and four in diameter, spire-shaped in outline, the grayish bark thinner and harder, the sapwood thicker and the cones smaller, and with firmer, darker scales than in the typical *P. ponderosa*. Foliage thinner, more inclined to be tufted at the ends of the branchlets, leaves usually in threes, but often in twos.

Sparsely distributed on the high slopes and plateaus of the Rocky Mountains, from British Columbia southward through Montana, Idaho, Wyoming and Colorado to northern New Mexico, and eastward to the Black Hills of North Dakota and Nebraska.

The "polymorphous" *Pinus ponderosa*, with headquarters in the Sierra Nevada of California, and extending along on the western ranges northward through Oregon to Washington, and southward through Arizona to Sonora, probably contains several more forms marked enough to rank as species—notably the "Brown-bark Pine" (my variety *nigricans*)—forming almost exclusively a large forest on the great Colorado plateau of central Arizona and New Mexico.

PICEA COLUMBIANA, nom. nov.†—Trees usually small and slender, rarely exceeding seventy-five feet in height, with a diameter of three feet. Bark light-colored, thin, hard and flaky; branches short, especially those on the upper half or two-thirds of the trunk, rendering the tree spire-like in out-

* *Pinus ponderosa*, var. *scopulorum*, Engelm. in Brewer & Watson *Bot. Cal.*, II., 126 (1880). Sargent in Xth U. S. Census, *Forest Trees of N. A.*, ix., 193. Lemmon in 2d Bienn. Rep. Cal. State Bd. Forestry, 98; 1st and 2d eds., *Hand-Book West-American Cone-Bearers*, 7 (1892); also in 3d (Pocket) ed. of same, 34. Coville in *Con. to U. S. Nat. Herb.*, IV., 22.

† *Picea Engelmanni*, Engelm. in part in several publications. Sargent in Xth U. S. Census, *Forest Trees of N. A.*, ix., 205 (1884), in the reference to trees "rare and of small size in the mountains of Montana, Oregon and Washington"; Lemmon in 3d Bienn. Rep. Cal. State Bd. Forestry, 113, so far as relates to the north-western form.

* The garden is best reached at present by alighting from train at Rosemont, Pennsylvania, on the Pennsylvania Railroad, and taking Robert's Road to Ithan Creek; the present owner is William H. Ramsey.

line; annual branchlets slender, two to three millimetres thick, those on the upper branches clothed in the bearing season with small yellowish, narrowly elliptical cones one and a half to two inches long; the scales thin, obovate, obtuse, with scarious, wrinkled edges, the scale-bracts very small, four to six millimetres long, acute; seeds brown, two to three millimetres long, with convex, obovate, shining wings. Forms a portion of the forests on the mountains of Oregon, Washington, Idaho, Montana and British Columbia, extremely northern and alpine forms being reduced to mere shrubs. The true *P. Engelmanni* inhabits the mountains of Wyoming, Colorado, Utah, New Mexico and Arizona, and attains a much larger size, often exceeding 130 feet in height, with a diameter of five feet. Bark thick, brown, deeply furrowed; lower and middle branches long, making the tree fusiform in outline; the branchlets robust, three to five millimetres thick; cones elliptical, two to two and a half inches long, brownish, the scales sub-rhomboid in outline, thicker and firmer than the other species, the scale-bracts four to six millimetres long, truncate or spatulate; seeds and wings comparatively large.

ABIES SHASTENSIS, nom. nov.*—This, the Shasta Red Fir, often attains a medium size, 100 to 120 feet in height, with a diameter of three to four feet. Bark dark outside, red within, deeply furrowed; foliage less robust than that of the typical *Abies magnifica*; the cones usually elliptical, with more protuberant scales, the apophyses clothed with short, stiff, recurved, brownish hairs; the scale-bracts usually developed to a great length, extending one-half to one inch from between the scales. Headquarters around the base of Mount Shasta, California, at altitudes of 5,000 to 8,000 feet, forming a large, dense, almost exclusive Fir forest. A few trees are found on neighboring slopes of the Scott, Trinity, Siskiyou and the southern end of the Cascade Mountains in Oregon. The true *A. magnifica*, reported originally from "the high unexplored part of the Sierra Nevada to the eastward of San Francisco," attains a much larger size, often 250 to 300 feet high, with a diameter of eight to twelve feet, its magnificent columnar trunk naked to a height of 100 feet; bark light brown outside, madder-red within, deeply fissured, on the largest trees three to five inches thick; the large purple or yellowish cones are almost cylindrical, truncate; the scale-bracts undeveloped, usually completely concealed. This, the Magnificent, or California Red Fir, inhabits the high Sierra nearly from end to end, usually mingling with other trees, rarely, as in the central portions of the Sierra, it forms almost exclusive forests of exceeding grandeur.

Oakland, Calif.

J. G. Lemmon.

New or Little-known Plants.

Ribes erythrocarpum.

THIS pretty *Ribes* was discovered by Dr. F. V. Coville, of the Department of Agriculture, who found it last August in flower in the neighborhood of Crater Lake, in southern Oregon, then a virgin territory for the botanist. At an elevation of about seven thousand feet above the sea, it is comparatively common in the shade of noble trees of *Tsuga Pattonii*, which here grows to its largest size and forms the principal part of the forest. It was found a month later with ripe fruit in the same locality by members of the Forest Commission of the National Academy of Sciences.

Ribes erythrocarpum† (see illustration on page 185 of this issue) is a trailing, glandular hirsute shrub with elongated,

slender, unarmed stems rooting and producing short ascending branches five or six inches in height, rugose orbicular, three to five lobed, coarsely crenate leaves, erect racemes of from ten to twenty flowers with glandular calyx-lobes and broadly spatulate reddish petals and erect subpyriform to spherical bright scarlet fruit about half an inch in diameter and covered with glandular hairs.

In the structure of its flowers *Ribes erythrocarpum* is closely related to *Ribes laxiflorum*, from which it is distinguished by its prostrate stems, and glandular hairs which resemble those of *Ribes viscosissimum*.

The seeds of this *Ribes* have been sown in the Arnold Arboretum, and it will probably, therefore, be possible to test the value of this pretty and distinct species as a garden plant.

Plant Notes.

Pelargoniums at Cornell University.

THE issue of GARDEN AND FOREST for July 25th, 1894 stated that a prize offered the year previous by the Massachusetts Horticultural Society for Pelargoniums did not bring out a single entry. It will be no surprise, then, to learn that of the more than 400 varieties of this beautiful flower now in bloom in the forcing-houses of the horticultural department at Cornell University, very few were obtained from eastern growers. The plants of the Zonal-inquinans races (popularly, Zonal Geraniums, Fish Geraniums, Horseshoe Geraniums, etc.) and the Ivy-leaved Geraniums were almost all furnished by E. G. Hill & Co., of Richmond, Indiana, and W. P. Simmons & Co., of Geneva, Ohio, and the Show and Fancy Pelargoniums from John H. Sievers, of San Francisco, while Geranium fanciers here and there have added to the collection. Botanically, these are all Pelargoniums, but the old name Geranium has clung so persistently to three of the races, namely, the Zonal, the Ivy-leaved and the Rose or Sweet-scented, that until the true botanical name shall have come into general use, one runs less risk of being misunderstood by following the gardeners' nomenclature. Of the varieties at Cornell, more than 300 are Zonal Geraniums, some seventy are gardeners' Pelargoniums (Pelargonium, section Pelargium of Harvey), and 28 are of the Ivy-leaved series.

The Ivy-leaved Geraniums are very graceful trailing plants, with a bright scarlet flower, or one with tints running toward the light red and orange scales. The modern growers show a preference for the double-flowering varieties, following doubtless the demand of the public—a choice fully justified by a comparison of the ample, well-clothed modern flower with the more scantily furnished older type. The ivy-like leaves, the grace of their trailing habit and the pretty flowers make this variety a charming plant for the hanging basket or for any spot where the trailing plant can be used with advantage.

The tradition receives an apparently unanimous assent that all the hundreds, we might say thousands, of varieties of Zonal Geraniums are descended from two parent races—the Pelargonium inquinans and the Pelargonium zonale—imported from the Cape of Good Hope and grown in England as early as 1710 and 1714 respectively. These have been crossed and recrossed with each other and with their descendants to such an extent that a European-cultivated flower can no longer be found that represents either of the parent types. A mixed race has been produced, the Zonal-inquinans. In 1732 there were alive in Sherard's gardens at Eltham, England, six species of Pelargoniums. The first edition of *Le Bon Jardinier*, that of 1773, published at Paris, mentions but three sorts. A recent catalogue of Cannell, the English grower, contains the names of upwards of 700 varieties; one of Brünt (Poitiers, France), upwards of 900; and a little book by H. Dauchenay, published this year at Paris, treating only of the Zonal-inquinans race, contains the names of more than 3,500 varieties, many of which have, of course, disappeared from cultivation.

The type of Geranium best known on this side of the

* *Abies nobilis* (Lindl.), Engelmann, Brewer & Watson, *Bot. Cal.*, ii., 119 (1880), in part, so far as relates to "the Red Fir of northern California forming large forests about the base of Mount Shasta."

Abies magnifica, Murr., Sargent in Xth U. S. Census, *Forest Trees of N. A.*, ix., 914 (1884), in part.

Abies nobilis, var. *magnifica*, Masters, *Journ. Linn. Soc.*, xxii., 189 (1887), in part, with pl. 5.

Abies magnifica, var. *Shastensis*, Lemmon, in 3d Bienn. Rep. Cal. State Bd. Forestry, 145 (1890); and in 1st and 2d eds. *Hand-book West Am. Cone-Bearers*, 13 (1892); also in 3d (Pocket) ed. of same, 62, with pl. 11 (1895).

† Coville, *Proc. Biol. Soc., Washington*, x., 131 (1896).

Fig. 21.—*Ribes erythrocarpum*.—See page 184.

1. Flowering branch, natural size. 2. Fruiting branch, natural size. 3. Vertical section of flower, enlarged. 4. Cross-section of fruit, enlarged.

Atlantic is that of the double-flowering Zonal-inquinans varieties, perhaps on account of their qualities as bedding plants. Here, in accordance with the demands of modern taste, to the old scarlets, often very vivid, have been added, in the coloring of the flower, the lighter tints of red and of

orange. In the double-flowered sorts the individual flower loses character, and its importance is absorbed by that of the truss, which, whether large or of medium size, should be copiously and compactly furnished. There seems to be a preference for plants of a dwarf habit. The specimens

grown at Cornell have proved, as a rule, to answer to the descriptions in the catalogues, and intending buyers may be safely directed to them for the choice of the color of flower and habit of plant they prefer. So, too, with the variegated-leaved Zonals, including the bronze Zonals. But few of these latter are included in the Cornell collection. The flowering ones are interesting, in that their flowers are of the primitive, narrow-petaled type, and a comparison of them with the productions of later years furnishes a comparison of the advance made. This consists mainly in the rounding and enlarging of the general form of the single flower and the filling out of the petal, so that now the petals almost completely overlap and the intervening spaces have disappeared.

As early as 1841 *The Gardeners' Chronicle*, of London, in congratulating the public upon the advance already made in the Zonal Geranium, said: "The long, narrow, flimsy petals, moved by every breath of wind and separated to their very base by broad open space, have been succeeded by the beautiful compact flowers of the present day, with broad short petals, so entirely overlying each other as to leave scarcely an indentation in the outline of the flower."

The illustration on this page shows the flowers which *The Gardeners' Chronicle* then set before its readers. It has to do, perhaps, with the success of the English growers that they should at so early a period have had before them a distinct ideal. Moreover, it is interesting to note that the English and Continental types tend toward the same ideal of beauty, so much so that Monsieur Dauchena, in the book already referred to, has to choose other characteristics than those of the flowers to distinguish between certain of the races. If a first place must be given to races, several of which produce such beautiful individuals, it will probably be awarded to the English round-flowered varieties, brought to their present perfection by Cannell, Pearson and other English growers. They are beautiful in the size and symmetry of both truss and individual flower, and especially in the lighter tints of the red and of the orange scales. And yet, if after having looked at a group of these flowers the eye happens to fall upon one composed of the masterpieces of the French growers—Bruant, Lemoine and others—this judgment is apt to be questioned. If we may take the Cornell collection as a fair representative of both, we will say that the English have attained great beauty in the lighter tints, and that the French, while not behind in these, have produced some reds which for depth and brilliancy are superb. There is, by the way, probably no floral subject to which these superlative terms, so much misused, can so often aptly be applied as to the modern Geranium flower.

An interesting introduction of the French are the "Panache," or "splashed" series. In these the various tints of red are underlaid or mixed with white in the most diverse manner, sometimes producing the effect of mere spots of one color or the other, sometimes that of a gradation from a light tint to a deep shade running from the centre to the tip of the flower, or vice versa. An interesting morphological development, and a somewhat uncommon one, is that of the umbellule. A single flower of an

umbel is raised above its companions by a stem that has lengthened into a short stalk. As to the symmetry and size of the plants themselves, those in the Cornell collection are too young to allow of safe judgment. As the plants began to flower, a feeling of disappointment was quite general, which can hardly be explained now that it has yielded to one of admiration. Perhaps the long stalks of the flowers shocked at first; perhaps the first colors to develop were the least pleasing. In any case, if there is a fortunate difference in opinion as to the relative beauty of various flowers, there is none as to the beauty of the collection as a whole.

It would be invidious to recommend particular flowers among so many beautiful ones; and, again, the intending purchaser may be sent to the catalogues of the reputable growers for the color and habit of their choice. If the Zonal Geranium is a somewhat formal flower, it cannot be said of the simple-flowering varieties, as it can of the double-flowering sorts, that the individuality of the individual flower has been merged into that of the truss. As to color, the range is not wide, embracing as it does only the scales of red and orange, and running to white; yet, within these limits, it is very rich, offering from a pure white or the mere suggestion of a tint or an iridescence, to the deeper tones of its characteristic lines. Who knows but the Zonal Geranium may sometime become as favorite a flower here as it is in England, whence the London correspondent of *GARDEN AND FOREST* could write a few years ago (*GARDEN AND FOREST*, November 28th, 1894), referring to Mr. Cannell's autumn exhibition of Zonal Pelargoniums: "They are as delightful to look upon as is the return of spring. . . . I question if there is anything in the whole range of garden exotics which has the same all-round value as the race of Scarlet Geraniums?"

Cornell University.

W. S. A.



Fig. 22.—The "improved" and "original" forms of Pelargonium flowers as illustrated over fifty years ago in *The Gardeners' Chronicle*.

Cultural Department.

The Hippeastrums.—III.

HYBRIDS.

IN the days of Dean Herbert many fine hybrids of *Amaryllis* were raised, which, however, were mostly lost again. About a hundred of these were described and many were figured in the second edition of Sweet's *British Flower Garden* (1830). Dean Herbert, in his excellent work, *Amaryllidaceæ* (1837), enumerates and gives the parentage of thirty-one of the finest hybrids raised by himself and others. The first hybrid of which we have any knowledge is *Hippeastrum Johnsonii*, raised by Mr. Johnson, an amateur, in 1810, from *H. Reginae* and *H. vittatum*. It is very robust, free-flowering and beautiful, and still the most common of all *Amaryllis* in cultivation. A lover of *Amaryllis* usually starts with this one when forming a collection, as it is easily grown, and it is not uncommon for it to flower twice a year. The fragrant, showy flowers, of which four to six are carried on a scape about eighteen inches high, are deep cherry-red, banded with white. Scarcely any other flower is so frequently seen, and in such prime condition, in windows and gardens as this *Amaryllis*. Its abundant deep green strap-shaped leaves are usually fully developed when the large trumpets open. In the Gulf region it is one of the most common and highly prized garden flowers. It flourishes luxuriantly in the open air as far north as southern Missouri and the City of Washington, but requires a good winter protection of ashes, sawdust or leaves. In the south it forms in a few years large clumps which often produce twenty to thirty flower-scapes at the same time and make beautiful masses of bloom. This robust hybrid is a good example of the survival of the fittest, as all the early weaker-growing kinds were lost soon after their introduction.

Another noteworthy cross still in cultivation is *H. Ackermannii*, raised in 1835 from *H. aulicum* platypetalum crossed with *H. psittacinum*. It is of fine open form and marks a great advance on all its predecessors. A few years later *H. Ackermannii pulcherrimum* was obtained from *H. aulicum*, crossed with *H. Johnsonii*. Its beautiful, symmetrical form and good substance, in addition to its dazzling red color, gave a considerable impulse to the culture of these wonderful bulbous plants.

I have before me three colored plates of *Amaryllis* published in *Flore des Serres* about forty years ago, each plate showing four different hybrids raised by the late Louis van

Houtte, of Ghent. Although pronounced as the very best Amaryllis of their time they would scarcely attract more than a passing glance to-day. They all show unique and often brilliant colors, but all are characterized by narrow, pointed segments, scarcely broad enough to exclude the light from behind. At the same time Van Eeden took up the cultivation of the Amaryllis with marked success, as his fine hybrids H. Count Cavour and H. Fidelio show.

S. A. De Graaf, of Leyden, Holland, is usually termed the Amaryllis King. He has raised and introduced many thousand exquisite, broad-petaled and finely formed robust-growing hybrids. These plants have been cultivated in the family of Mr. De Graaf since 1790. At first only the species were crossed and intercrossed, and though rich colors were obtained, the flowers were small. The present Mr. De Graaf began to hybridize in 1862. From a fine hybrid named after his family, H. Graveana and H. psittacinum, the very robust and strikingly beautiful Empress of India was raised. This hybrid is of glowing orange-scarlet color, with broad white bands, changing in the tube to a yellowish green. The segments are very broad and the flowers are of gigantic size, measuring about eight inches in diameter. With the appearance of this remarkable hybrid a new era in hybridizing Amaryllis began. All the sorts now sent out by Mr. De Graaf are stately in growth, exceedingly rich in color and of fine form. Bulbs fifteen to eighteen inches in circumference are produced, as a rule, each bulb sending up from two to four flower-scapes, each crowned with four to six flowers. Of the following almost all vie in beauty with Empress of India: Professor Koch, Van Speyk, Jacob Cats, Franz Hals, Laurens Koster, Rubens, President Carnot, Mozart, Louis Pasteur, Willem III. and Surprise. Of the light-flowering hybrids the following are the most beautiful and robust: Elvira, Waterloo, Conqueror and Schiller.

The introduction of H. Leopoldii and H. pardinum afforded an excellent opportunity to Messrs. Veitch & Sons, of Chelsea, England, to attempt the improvement of the beautiful hybrids raised by Mr. De Graaf. In 1867 they raised the very glowing broad-petaled Chelsoni and Brilliant. Unfortunately these forms are weak growers and not easily kept in good health. Later, Mr. John Heal, who is in charge of the great Amaryllis collection of Chelsea, crossed De Graaf's Empress of India with the best forms of Leopoldii, with the result of obtaining not only four to six flowered scapes, but also decided breaks of color into various shades and tints, and from the intercrossing of forms so obtained has resulted the race of Amaryllis now so universally admired. Almost all the named Amaryllis sent out by Messrs. Veitch at present are of the most symmetrical form and as beautiful in every respect as any Lily. I have just now the following in bloom: Crown Princess of Germany, very short-tubed, open, broad-petaled, rosy white clouded with deep glowing red; John Heal, deep red with a yellowish white star and points of segments broadly tipped, creamy white; Milton, Meteor and Enchantress, all of a light color lined and penciled with red; Southey, Star of India and Ne Plus Ultra, all of vigorous growth and bright red color.

A little later Mr. B. S. Williams, of London, also began the hybridizing of Amaryllis, but on an entirely different line. His results are among the best achieved. He succeeded in raising the exquisite Amaryllis, Dr. Masters, a small-flowered but exceedingly gorgeous hybrid, a glowing crimson-scarlet self, without a trace of any other color. This kind is easily grown, and flowers profusely when very small, in the window as well as in the greenhouse. Mr. Williams has also raised robust-growing, large-flowering hybrids, of which Lady Ardilaun, Joseph Chamberlain, Ornata and Magnæflora are fine examples, but he especially excels in the smaller-flowering, symmetrically formed kinds, particularly those flowering in autumn. These have mostly been derived from Hippeastrum reticulata and its progeny, and almost all have short broad leaves, striped with a conspicuous white band. Of these Mrs. Garfield, Mrs. William Lee, Comte de Germiny, George Firth and R. J. Pitcher are the most beautiful now in cultivation.

One of the best Amaryllis cultivators and an excellent writer on the subject is Mr. James Douglas, of Great Gearies, England. He has a fine private collection and has raised a number that rival in gorgeous coloring those obtained by Mr. John Heal, of the Messrs. Veitch. I have quite a number of his kinds in my collection, and all are beautiful. The most noteworthy are Serapis, Clarinda, Cleanthes, Prince Albert Victor, Grand Monarch, Great Gearies, etc. His accounts of these royal plants in the English horticultural journals have done much to disseminate information on the subject, and many flower lovers have been induced by him to take up their cultivation.

Milwaukee, Wis.

H. Nehrling.

Early-flowering Shrubs.

GARDEN AND FOREST has often called attention to the beauty of the foliage of trees in early spring, not only on account of its delicate texture, but on account of its wonderful color, which is different in every species and sometimes in the individual trees of each species. It often changes between morning and night through a range of color entirely different from that which the same leaves assume in autumn. Of course, these spring tints are not as vivid as those of autumn, but they are quite as rich, and our forests never show more wonderful variety of tone than they do through the hazy air of early May. But I do not remember ever to have seen much stress laid on the varying colors of the foliage of shrubs in spring, although this is almost as beautiful, and it adds one more to the many delightful aspects of the shrub border. For general form, for luxuriant flowering, for variety of foliage, for beauty of fruit in summer and winter, for the depth of the color of its foliage in autumn, much has been written about shrub plantations, but it well may be added that between the middle of April and the last of May the variety of form and color in the leaves of any extensive plantation of shrubs brings a constant delight. The light yellowish green of some of the low Willows, the gray of the Elæagnuses, the dark bronze or deep wine-color of some of the Viburnums with all shades of green between, make a variety which is almost infinite.

This is the flowering season of many shrubs; the very earliest of them, like the Chinese Bush Honeysuckles, *Lonicera fragrantissima* and *L. Standishii*, are already past their bloom. So are the Spice-bush, the beautiful Cornelian Cherry, *Daphne Mezereum*, the Leatherwood, *Andromeda floribunda* and its Japanese relative. Several of the Currants are still in flower, and among them the western *Ribes sanguineum*, which is occasionally seen here, though it does not do as well as *R. aureum*, the well-known Missouri Currant, with its bright golden-yellow flowers. The hybrid *R. Gordonianum* is very hardy, being a cross between *R. aureum* and *R. sanguineum*, and bears flowers abundantly in racemes. There are many other varieties and species of Currant which ought to be in gardens and which are found in collections like the one in the Arnold Arboretum. For example, the American Red Currant, *R. rubrum*, is a beautiful object when in flower. Out in the swamps the fragrant *Andromeda polifolia* is in bloom, but it is rarely seen here in cultivation, although it does just as well in a border and flowers as freely as it does when it is in the peat bog where it naturally grows and is sometimes almost entirely submerged in water. The little Swamp Laurel, *Kalmia glauca*, a low shrub from the far north, is just opening its lilac-purple flowers, and so is the beautiful *Rhodora*, which is known by Emerson's poem to a very great many people who have never seen its rosy flowers in a cold northern swamp. *Rhododendron Vaseyi* is showing its clear pink flowers, which are quite unlike either of those of other Azaleas. Many years ago GARDEN AND FOREST recommended the crossing of this plant with the *Rhodora*. Has any one tried the experiment? The Siberian Pea-tree, *Caragana arborescens*, and the shrubby *C. frutescens*, which begins to flower a day or two earlier, are both now showing their bright yellow pea-shaped flowers in clusters from the axils of the leaves. *Daphne Genkwa* is displaying its tubular flowers with the singular bluish-lilac color which no hardy shrub of the season exactly matches. *Spiræa Thunbergii* has passed out of bloom, the old-fashioned *S. prunifolia* is still covered with its double flowers and will soon be followed by half a dozen more, while *Exochorda*, often called the Pearl Bush, Japan Quinces in variety, *Rhodotus* and many others are in full beauty. Among the smaller trees the Red-buds, many of the Plums and a wonderful variety of flowering Apples and Thorns are in full bloom. In short, the shrubbery is never more beautiful than it is in early May.

New Brunswick, N. J.

R. Ennis.

Orchids in Flower.

THE greenhouse is as gay with flowers in April as in any month of the year, and the Orchid-house quite holds its own, with most of the genera represented. Cattleyas are probably most numerous. Fine forms of *C. Trianae* are in flower, and one of the most distinct is the variety *Schröderiana*. *C. Lawrenceana* is bearing some handsome spikes of five and six flowers. *C. intermedia*, *C. Skinneri*, *C. Mendelii* and *C. maxima* are all in full flower, while the flowers of *C. Mossiæ* are just pushing through the sheath.

Among *Dendrobiums* a few flowers of *D. nobile* still remain, while *D. densiflorum* and *D. thrysiflorum* are just coming to their best. Fine flowers of the fragrant *Cymbidium eburneum* are still to be seen.

Cypripediums are not so plentifully represented at this season. *C. villosum* will soon be past its best. *C. Lawrencianum* is just coming in, and this deservedly popular variety is attractive both in flower and foliage. *C. caudatum*, or *Selenipedium caudatum* as it is now classed, is bearing some fine flowers, which, with their long tail-like petals, are more quaint than showy.

The somewhat rare *Bifrenaria Harrisoniæ eburnea* is bearing its two-flowered spikes of ivory-white flowers. A few flowers of *Lycaste Skinneri* still linger, though somewhat out of season. This is one of the longest-standing Orchids we have if taken care of, but the least touch disfigures it, and it must, therefore, be carefully handled. *Odontoglossum Harryanum* is carrying some fine spikes, while the little *O. Rossii* and its variety *O. Rossii majus* still produce a few flowers. *Oncidium splendidum* is just at its best and is bearing noble spikes of richly colored flowers. The flower-spikes of *Renanthera coccinea* are fast pushing out, and an abundance of bloom is promised. Several varieties of *Phalænopsis* are still in flower, *P. amabilis* and *P. Schilleriana* being most abundant. *Schomburgkia undulata* still holds its brownish purple flowers in good condition, but they will soon be past their best.

Tarrytown, N. Y.

William Scott.

Irises.—To continue the calendar of Irises, *I. fumosa* in mid-bloom now proves to have a flower of a light yellow color more pleasing than *I. Caucasica*, with a little smokiness, but it is not a very effective garden plant. In foliage and habit it is akin to *I. Sindjarensis*. The first of the rhizomatous Irises flowered last week. *I. rubro-marginata*, which I have before described as a very dwarf species with scythe-shaped leaves and small flowers an inch across, dark red-purple, tinged with blue, in color. It has tall and large standards. It is a bearded Iris from Asia Minor. Other Irises now in flower are *I. pumila* and its white variety, both dwarf kinds, six inches or so in height; also *I. Chamæiris*, a species growing about a foot high, with pleasing yellow flowers. About the same height is *I. Olbiensis*, a dark purple-flowering kind, very desirable and effective. Somewhat dwarfier is *I. lutescens*, with pale yellow flowers and falls slightly tinged with purple; from a garden point of view, an inferior species. Similar in habit and size is *I. Statellæ*, a species with creamy white flowers and yellow markings on the falls. The color is very pure in tone and the species one of the most desirable. Also at this time flowers *I. Tectorum*, the Japanese Roof Iris, though it is under protection, and has never been tested for hardiness in my garden. It flowers before it has made much new growth. The flowers are very handsome, with wide falls light lavender in hue, darker markings of the same color. This Iris has a very pretty habit, the sword-like leaves being somewhat relaxed. My plant produces double flowers, if that describes the curvature, which may be its normal form, or otherwise.

Elizabeth, N. J.

J. N. G.

Correspondence.

Bibliographical Notes on American Trees.—II.

To the Editor of GARDEN AND FOREST:

Sir,—In No. 477 of GARDEN AND FOREST, Mr. Farwell calls for a more explicit statement of the case of the publication of *Abies* as a genus by Duhamel in 1755. He credits me with saying that "Duhamel published a genus *Abies* in 1755," but complains that I "fail to state what his type was." It is true that I did not indicate what was Duhamel's type; but that was not and is not necessary, inasmuch as I did not publish any such ambiguous statement as that Duhamel presented a genus *Abies*. I said the genus *Abies*; and that expression implies that the author has the Firs, not the Spruces, for his type. Of course, all early authors included the species of *Picea* and of *Tsuga* under *Abies*, Duhamel with the rest; but they are quite as unanimously accepted the true Firs as the type of *Abies*. In this Duhamel is even more explicit than some others, for, in characterizing *Abies*, he states that the more genuine species—the *Abies* proper—have upright cones, two-ranked foliage, etc. And then, in the enumeration of the species, the common Old World Fir, *Abies alba*, Mill. (*A. pectinata*, Lam.), holds the first place, as being the type of the genus.

In attempting to establish the identity of Miller's *Abies Canadensis* with the *Pinus Canadensis* of Linnæus, Mr. Farwell has at least presented a curious, if not, indeed, a very difficult problem in nomenclature, though his own way of solving it will not satisfy every one. In the process of his reasoning

some important considerations seem to have been left out of view, as, for example, the possibility that both Linnæus and Miller may have had two different trees, perhaps of different genera, included under the specific name *Canadensis*. For, if it be admitted that Linnæus' descriptive phrase, "*foliis solitariis linearibus obtusiusculis submembranaceis*," applies to and indicates the Hemlock Spruce, it is more certain that the synonym which he adduces from Miller, and which ends with the character "*conis parvis biuncialibus laxis*," cannot belong to the Hemlock Spruce; for the cones of this are not "lax," nor are they even one-half of "two inches long"; but this, the essential character, does apply to what Miller calls the "Newfoundland White Spruce Fir." It is quite conclusive, then, that our White Spruce forms a part, at least, of the *Pinus Canadensis*, Linn., and if the Hemlock Spruce was at all intended by him, under the name *P. Canadensis*, then his so-called species of that name is made up of two trees of different genera—a situation in which that celebrated author placed himself upon almost every page of the *Species Plantarum*. It is even possible to think that by his *P. Canadensis* nothing at all but the White Spruce is intended. Miller, a contemporary of Linnæus, a careful botanist, and particularly interested in trees introduced from America into Europe, had not the remotest suspicion that the *P. Canadensis* of the *Species Plantarum* meant anything but the White Spruce. Linnæus had cited his figure of it, published in 1760, as a type, and he himself in 1768 seems innocently to have returned the compliment by adopting, and giving the first place to, Linnæus' descriptive phrase. If by that phrase anything else than the White Spruce had been intended, Miller was completely unaware of it. And as for the Hemlock Spruce, it is plain that Miller, in naming and publishing it as *Abies Americana*, believed himself to be naming a tree of which Linnæus had made no mention. When, therefore, it is proposed, as by Mr. Farwell, that the two names, *P. Canadensis*, Linn., and *Abies Canadensis*, Mill., must be received as applying to the same species, we are ready to answer: Yes, unless under each name two species are included. But when it is said that both names apply primarily to the Hemlock Spruce, we are obliged to protest, first, that Miller both implicitly and expressly denies that he had such intent; and second, that it remains to be shown that even Linnæus meant, by *P. Canadensis*, the Hemlock Spruce.

Catholic University, D. C.

Edw. L. Greene.

Is the White Pine Doomed?

To the Editor of GARDEN AND FOREST:

Sir,—I have been interested in the discussion of this question in your columns, and I will leave the scientists to decide whether coniferous forests must ultimately give place to those of deciduous trees. In my experience I have found species of both classes of trees which it seemed to me must fail sooner or later because they are unable to produce seeds of good germinating quality, but the White Pine is not one of these. When I lived in Vermont fifty-nine years ago they were cutting timber on Woodford Mountain, adjoining Bennington, for charcoal. An old Vermonter surprised me by saying that wherever a forest was cut down a new kind of timber was sure to take its place. This was the first time I had heard this statement, though it was by no means the last, and when I asked him where the seed came from he replied that he did not know. White Pines are trees which I have admired more than any others, and I have watched them during all these fifty-nine years. In that period I have traveled among White Pine forests in New England, both Canadas, Michigan and Minnesota, and it never once occurred to me that White Pine was losing its power to reproduce itself from lack of seeds, and while I have planted seeds of this tree and sold them for both the home and foreign market, except in a single instance, I have never found any difficulty in securing all I wanted. In that case I sent to Germany and bought eight hundred pounds of seed that had been shipped from Halifax a few weeks before. My experience is that a White Pine-tree will average a full crop of seed once in three years. One year the tree will be well filled with embryo cones, the second year it will perfect a good crop of seeds, and the third year it forms buds for the next crop. I have seen White Pine-trees cut down in Vermont to clear up a farm, and when I visited the same place forty years later I have found the farm run out, while the few Pines that had been left among the rocks on the mountain side had filled the rough places with saplings and seedlings. Several years ago we had an application from a German seedsmen for forty hundredweight of White Pine seeds—that means 112 pounds to the hundredweight and 20,000 seeds in every

pound. A Vermont man secured the order and he is probably shipping from there yet. Around Hanover, New Hampshire, an immense quantity of this seed could be collected, and upon the whole, my experience is that the White Pine is spreading over land where it was not known a century ago.

Many years ago Burnet Landreth wrote to me to say that on some land he owned in Virginia there was a large White Pine-tree which he thought had grown from seed dropped accidentally and this had seeded the land to a wonderful extent all about it. I met with a greater surprise than he did when I went to North Carolina to plant three hundred acres of White Pine on the Vanderbilt estate. Right in the city of Asheville on the hillside stood two White Pines on a steep bank, and these had seeded the long slope with Pines up to twenty feet high, and in several months' leisure I had there explored a great part of the mountains of western North Carolina and eastern Tennessee, and found White Pines in groups here and there, and in many places in uncultivated hills, and in no instance did I notice a sign of very old or decayed trees.

On our sand dunes where there were hundreds of large trees when I came here fifty-three years ago, straight White Pine logs were used by the settlers to make houses and barns, and the gnarly, stunted trees that were there then still stand and produce seeds freely, and seedlings, too, but these are burned up by fires which run over the ground almost every year. Now, these White Pines in Tennessee and Carolina produce seedlings in wonderful quantity and they are of all ages, while the Tulip-tree, although growing in abundance everywhere, produces very few seedlings, and these are separated by ten or a dozen years of age. We have had samples of seed of the Tulip-tree from Indiana, southern Illinois, Kentucky, Tennessee and North Carolina, and we have never found more than ten per cent. of it of germinating quality. All the while I was at Mr. Vanderbilt's place we could find no seedlings, or, at least, very few in a long ramble, except in one instance where a tree had been broken nearly off at about ten feet from the ground with the top still attached. There we found about a thousand seedlings three years old. Perhaps this experience may help some one in theorizing on this interesting problem.

Waukegan, Ill.

Robert Douglas.

A Wholesale Market for Cut Flowers.

To the Editor of GARDEN AND FOREST:

Sir,—One of the principal wholesale markets for cut flowers in this city besides the Cut-flower Exchange, on West Twenty-third Street, and the wholesale commission dealers, is the one at the foot of Thirty-fourth Street, on the East River. Here about 150 growers come each morning throughout the year, including Sunday. The first sellers and buyers are on hand as early in the morning as five o'clock, but six o'clock is announced to be the opening hour after June the first. The floor of the second story used for the market measures, perhaps, 100 by 50 feet. Space on counters along the walls and in the middle of two large rooms is let at the monthly rate of sixty-five cents a foot to stockholders of the concern, and seventy-five cents to non-members, four feet being the average space rented. Growers come from fifteen to twenty miles out on Long Island, from College Point, Bayside, Great Neck, Floral Park, Woodside, Newtown and other sections. Germans predominate among the sellers, some of whom have attended these sales since their establishment, about twenty-five years ago, and among the buyers are many Greeks, with English-speaking women and men, who have street-stands and small stores of their own. While most of the customers are of these classes, representatives of some of the best stores in New York and Brooklyn come here for any chance novelties and flowers of specially good quality. These early sales are a convenience to small dealers, who can buy the day's stock and have it on their premises by eight o'clock, before the Cut-flower Exchange and commission men have begun business. The early hours here are, however, a disadvantage during midwinter, when buyers do not find it easy to start out before daylight, and the wholesale markets are thus brought into more direct competition, with the effect of lowering prices here. After April the earlier hours are appreciated, as improved prices indicate. At this time of year the main business is done from six to seven o'clock, when a babel of languages is heard. The stock is brought to town by trolley and train, and is carried in large oblong baskets or in great arm-loads. During the Chrysanthemum season and at Easter, the busiest times of the year, two or three persons are often needed to bring the product of one establishment, but it is astonishing how much is packed into one basket and how tightly the flowers

are bunched without showing injury after they are opened up. A large basket, with the enforced capacity of a good-sized trunk, and an armful of ten dozen chrysanthemums or lilies are readily carried by one person. The retail city trade on Saturday regulates the volume of Sunday morning purchases here, but, as a rule, only about one-third as much trade is done then as on week days.

On a visit on Saturday morning, May 8th, a great variety of the cheaper homelike and familiar flowers was noted. Candytuft, long, luxuriant stalks of white Snapdragon, Stocks, Sweet Alyssum, Mignonette, Geranium-leaves, Chinese Narcissus, Narcissus poeticus, Lily-of-the-valley and other bulbous flowers; Forget-me-not, Marguerites, Sweet Peas, Heliotrope, Lilac, Bermuda Lilies, Carnations and hybrid Perpetual Roses were the staple stock. Neat bunches of wild Violets were offered at sixty cents a dozen; attractive bunches of the dainty and fragrant Daphne Cneorum, of about two dozen stems, at \$1.50 a dozen; callas at fifty cents a dozen, and the best Harris lilies at the same rate. Only a small percentage of the carnations were of high grade, and while these sold for \$1.50 a hundred, \$1.00 was a general price, and short-stemmed flowers were offered at fifty cents. The arrangement and display of the flowers showed little of the taste and skill which are seen in the markets where more choice and costly flowers are sold, and had the suggestion of out-of-door flowers from a country garden rather than of flowers grown under glass with the highest art and best appliances. For example, it was not uncommon to see three distinct and conflicting colors of carnations in one bunch of a hundred. To be sure, this variety of kinds in a small quantity made a more salable package to offer to small dealers, and, as the object of the market is to sell flowers, no reasonable fault can be found with want of æsthetic arrangement. The range in quality of roses was most marked, and, besides *Perle des Jardins*, *Bride*, *Bridesmaid* and other similar varieties at a dollar a hundred, included the same sorts at three and four times that amount, and *Ulrich Brunner* at \$1.50 and \$2.00 a dozen. There were occasional offerings of the old *Lamarque* rose at low prices, and considerable quantities of well-grown moss roses at \$1.50 a hundred.

Primulas were seen more rarely, and showy Parrot tulips, yellow centaureas, trusses of hydrangeas, branches of flowering Almond, *Astilbe*, *Deutzia gracilis*, *Genista*, double-flowering Peach and *Spiræa Thunbergii*. Buds of the richly colored *Pæonia tenuifolia* in their fine foliage made a pleasing effect on the eye, though a quantity of these flowers indoors has a disagreeable odor. Spikes of gladioli were seen once or twice, and of *Cymbidium eburneum* and *Dendrobium*. *Funkia*, maiden-hair fern, asparagus and smilax were quite abundant, and several dealers sold only remarkably fresh-looking polypody and common brake, *Pteris*, gathered in the Catskills last autumn. By eight o'clock the last flowers had changed hands and been transferred to the baskets of buyers, and the departing throngs with filled and with empty baskets seemed strangely like those which had arrived a couple of hours before.

New York.

M. B. C.

Spring Notes from Germantown, Pennsylvania.

To the Editor of GARDEN AND FOREST:

Sir,—I have observed that the color of flowers seems to vary in different years, as if the special qualities of a given season had some influence in this matter. It is noticeable hereabouts that the flowers of the pink Dogwood are of a much deeper color this spring than usual. The foliage of what is known as the Blood-leaved Japanese Maple is also darker than usual, and these small trees were never more striking than they are now. In secluded nooks along the Wissahickon the rocks are all ablaze with the flowers of the Wild Columbine. How can these plants flourish with so little apparent nourishment? They not only grow, but they grow with great thriftiness out of crevices in the rocks where there is scarcely room enough for their roots and where it seems impossible for any soil to enter.

Among our most beautiful trees just now are the Crab Apples of various kinds. The variety known as the Transcendent has especially large white flowers, which are very fragrant, but the flowers of all the varieties are beautiful and abundant; their fruit, too, is ornamental, and much of it is excellent for jellies and the like. The so-called flowering Peaches, too, are particularly beautiful just now, a variety with crimson flowers being specially effective. Lilacs are slower in opening than usual, and this gives an opportunity for *Syringa oblata* to show its special qualities of earliness, as its flowers expanded in advance of all the forms of *Syringa vulgaris* by a

full fortnight. Many Crape Myrtle plants in Germantown which were left outside have come through the winter with little or no injury. It is observed that after these plants have passed through one season safely they are less susceptible to injury the next, and appear to increase in hardiness after they have stood out several seasons.

Germantown, Pa.

Joseph Meehan.

Notes.

During April 305,160 bunches of bananas were sold in New York city, mainly from Port Limon, Aspinwall and Jamaica.

It has been suggested that instead of the present plan of distribution of free seeds by the Government that the Department of Agriculture should issue legal-tender notes which Congressmen could distribute among their constituents, so that each one could purchase the particular kind of seeds or flowers or shrubs or trees he needed. Why not?

Two months ago we noted the first arrivals for the season of apples from Tasmania in the English market, and stated that, perhaps, as many as 100,000 boxes would be shipped to the United Kingdom during the year. That limit has been already passed, and double the amount will probably be received before the season is over, which will not be until well into next month, when apples of the current year from the northern hemisphere will be on sale.

A plot owner in the Cypress Hills Cemetery, Brooklyn, has been awarded damages from the Cemetery Association in the sum of \$3,500 by the Supreme Court of this state on suit brought for injuries received from Poison Ivy. The Justice, in charging the jury, held that it was the duty of officials to remove poisonous vines, and on application for a new trial, which was granted, he added that the verdict was a just one and that the plaintiff was entitled to damages.

The British Consul at Naples reports that barley is largely used at Naples in the manufacture of port wine. The grain is malted, after which the port wine bacilli are introduced into the mead, where they multiply abundantly and transform the immature beer into the richest port. After their work is finished a sufficient stock of the microbes is preserved in the laboratory for future use, and the product is then sterilized. The manufacture of a good quality of port from barley mead is certainly a new triumph of science.

Mr. E. P. Powell writes to *The American Agriculturist* that the proper way to treat Dewberries is to cover the plants in winter plentifully with leaves, and then in spring to tie them to stakes, allowing the leaves to lie between the rows, held down, if necessary, with a few shovels of earth or a few poles. The vines in this way are under the same conditions as in a natural state when they grow wild by fences. If they have this opportunity the vines will bear heavily, otherwise the fruit is liable to be only knobs and hard, half-developed berries.

Mr. Fred W. Morse, of the New Hampshire Agricultural Experiment Station, has been examining Canada wood ashes which is sold in that state, and he finds the proportion of potash so low in some of the cheaper grades that it looks as if the quality of the ashes had been deliberately reduced by partial leaching or by mixing leached ashes with dry ashes. Buyers of ashes should look with suspicion on a lot that appears excessively moist, because in such cases the potash is seldom equal to the proportion in average ashes. In the same station it has been found that Paris green is often adulterated with earthy matter, either clay or infusorial earth. Buyers of this important insecticide should use no Paris green which does not bear the trade-mark of well-known and responsible manufacturers.

The Conservator of the Forests in Australia states that there are forty-seven millions of acres in that country upon which useful marketable timber is growing, and that there are six hundred species or kinds of timber trees there. Mr. W. Botting Hemsley, quoting this in *Knowledge*, says that Mr. Ednie Brown, the Conservator, in his enthusiasm has included many trees that do not yield timber of appreciable commercial value, but if the total is reduced one-half Australia stands in conspicuous contrast with the most richly forested districts of the northern timber regions of the Old World, and rivals the coniferous forests of North America. With all this wealth in variety, almost the only commercially important kinds of Australian timber are the Gum-trees, and there are only about a score of these out of the 135 species spread over the country.

The May exhibition of the Massachusetts Horticultural Society, in Boston, was a delight to many visitors, and it was

especially interesting on account of a group of thirty seedling Amaryllises, shown by Mr. Kenneth Finlayson, gardener to Dr. C. G. Weld, of Brookline. These plants had flowered in two years and eight months from the seed, and many of them bore five or six blooms, each of great size and substance, splendid color and first-rate form. Mr. Finlayson well deserves the silver medal which he received. Another silver medal was given to Mr. William Donald, gardener to J. S. Bayley, Esq., for a variety of *Dendrobium nobile* which resembles *Sanderianum*, but which has been named *Bayleyanum*. *Boronia* and *Azaleas* of admirable quality were shown, and the *Calceolarias* were the best ever staged in Boston. Mr. Donald received the prize for these, but the collection of Mrs. B. P. Cheney (Mr. John Barr, gardener) was also admirable. *Narcissi* and *Tulips* were shown in first-rate form, and the *Streptocarpus* shown by John Barr were of the highest merit. Bonton, the new scarlet *Carnation*, exhibited by Mr. F. A. Blake, of Rochdale, attracted much attention.

The season for so-called deciduous fruits from California, which include all except the Citrus fruits, began in this city last Friday, May 7th, with the auction sale of thirty-six boxes of cherries, at \$1.50 to \$5.00 each. The first shipment of cherries was made from Vacaville, California, on April 26th, two weeks later than a year ago. But few California oranges are now arriving, and only four car-loads came here last week, against sixty car-loads and more a week during February and March. The retail fruit-stores make a gay display now. Besides cherries, oranges and grape-fruit, choice bananas and pineapples are shown, and large and luscious field and hot-house strawberries. Among the novelties now offered are peaches from Newport hot-houses, at \$1.00 each; hot-house grapes, from the same place, at \$4.00 a pound, and small muskmelons, from Boston, at twenty-five cents each. The first watermelons, from Key West, sell for \$2.00 each, and with these new-crop products Easter Beurre, Winter Nelis and P. Barry pears are seen; these cost from \$1.00 to \$1.50 a dozen. No less attractive than the fruits are the celery, mushrooms, asparagus, cucumbers and brilliant and perfectly formed tomatoes shown in the fancy-fruit stores.

The last issue of *The Garden* which has come to hand contains a beautifully colored plate of a variety of *Primula obconica*, which is really a selected form of the strain known as *Grandiflora*, with flowers twice as large as those of the species originally introduced, and of a light lilac or lavender color. The note which accompanies this picture states that this species so far has refused all attempts at cross-breeding, and, although the Messrs. Veitch have devoted much time and effort to it, no actual hybrid between *P. obconica* and any other species has resulted. Seedlings, however, have varied much in size, shape and color, and have improved much under selection. There is an especially beautiful one known as *Rosea*, the name indicating its special tint, which is said to be a great acquisition. This is really one of the most useful and popular plants which have been introduced in recent years, but care must always be used in handling it on account of the irritation and inflammation caused by its hairy glands. We believe that this fact was first brought to public attention by *GARDEN AND FOREST*, where the unpleasant results from careless handling were described as long ago as May 2d, 1888 (vol. i., p. 118; vol. ii., pp. 94, 154, 286). Sometimes this irritation causes a serious illness, but it can be prevented if the plants are always handled with gloves.

The *Northwestern Lumberman*, in speaking of the great flood in the Mississippi valley, says that the deluge has so far subsided that lumber will soon begin to move northward again over the overflowed region, but much of it will be unfit for shipment because it has been under water and is covered with silt. This dirt-covered material will all need to be cleaned, and this will involve a vast amount of work and expense. Where the cottonwood has been covered with water it will be practically ruined, as the dirt can hardly be washed out of its fuzzy fibres, and the result of this is seen in the fact that the price of this lumber has advanced one dollar a thousand. Lucky manufacturers whose lumber piles have been above the water will make the most of their advantages, and the effect will be seen in the market for oak and ash as well as for cottonwood. It will be several weeks before logging can proceed in the bottom-lands with the mills restored to running condition. There will be mud everywhere, tramways washed out, bridges and trestles destroyed, so that it will be midsummer before everything can be restored to order, with mills running steadily, and weeks more will elapse before the newly cut lumber is dry enough to ship.

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Art and Nature in Landscape-gardening.

THIS is the season when we receive the most frequent inquiries from amateur planters about shrubs, trees and herbs for what they call "decorative planting." Many persons who have lately acquired new homes in the country or in the suburbs of cities are now moved to beautify them in some way, and the first thought that occurs to every one is to secure an abundance and variety of what are known as "ornamental" plants. It is not our purpose to make out any such list, and even if we considered it advisable the season is too far advanced to begin to arrange for planting. Nevertheless, these requests suggest a word or two of counsel which may as well be repeated at one season as another. We have no novel doctrine to advance, nothing but a few principles which do not change every year like fashions in millinery.

The spring planting of trees and shrubs is practically over for the year, and where these have been planted by novices it is probable that they have been badly selected and planted in improper positions. Nevertheless, this fact is not utterly discouraging, for when once a landowner begins to take any serious interest in his home-grounds it is probable that the habit will grow on him and become a life-long and increasing source of refreshment and refinement. We have said that both planning and planting by novices are, as a rule, worse than unsatisfactory, for if there is any art which needs original aptitude, special training and long experience for the highest success, it is the art of planting public and private grounds. This statement will be admitted by most men of cultivation, but practically they do not realize its truth. An engineer or a botanist is considered qualified to plan a public garden. Places of remarkable natural beauty, when once they are acquired by a city, are often put under the control of commissioners, who may have a fair education and experience in business, and if they have in addition to this what is known as good taste they are esteemed perfectly competent to preserve these scenes, to develop their charms and to devise facilities for exhibiting them. Gentlemen of wealth who have some cultivation consider themselves quite able to lay out their own places, especially if they have the help of some journeyman gardener, who

often has no appreciation of the character and beauty of the grounds, and whose first work will be to despoil the scenery of all that makes it really valuable, and then begin the work of decorating it with flower-beds, Golden Elders and purple-leaved shrubs of various kinds. The worst part of the matter is that the men who are utterly lacking in their ability to foresee what a piece of ground will look like a few years after they have set out to "improve" it, are quite unconscious of their lack of qualification, and have not the slightest idea that any such qualification is needed. Even if they were capable of taking such a look into the future, they would not be competent to pass any intelligent judgment on the result of their work. The fact is that no one but a man of genuine creative faculty can see just what elements in a landscape are the essentials that ought to fix its character, or can estimate the relative proportional importance which should be given to each one so as to produce the best combined effect and invest the whole with a charm which is distinctly its own.

This brings us again to the point that for the treatment of any piece of ground, public or private, the counsel of a landscape-gardener of recognized standing should be at once taken. The novice who insists upon improving his own grounds must educate himself through his own mistakes. If he begins at the wrong end and buys a great many more novelties and oddities among trees and shrubs than he needs, and then wanders around in his lot for a place to plant them, he will soon see that his crowded grounds have no unity of expression or of purpose. If, however, he will endeavor to set before his mind a clear and definite picture of what his house and grounds together are to look like, and will then attempt to construct his picture, he will not be led to choose a plant simply because the catalogue pronounces it beautiful, but because it is necessary to complete his idea and give expression to his thought. All this sounds very simple, but he will find it no easy task to create such a picture even in imagination. But if he has in mind a design which is reasonably distinct, and for the details of which he can give intelligent reasons, he will certainly learn some things by his experience which very few of his fellow-men understand. When he studies his house and grounds not only as a unit, but in their relation to what is beyond them, and endeavors to shut out what is distracting or unsightly and preserve within a fitting framework the view of distant prospects that are pleasing, and when he attempts to provide for conveniences in the way of buildings and walks and place them so that they do not disturb his picture, he will learn that it requires not only taste, but hard study, to solve the complex problem that he has in hand. He will learn, too, that even within the modest limits of his home acre there are chances for an individuality of plan and for a refinement and finish in the details which an artist of the first rank would not deem unworthy of his powers.

The objection is sometimes made to the work of artists in landscape that, after all, purely natural scenery is the most impressive, and the art of man can only interfere with nature to belittle it or weaken its strongest effects. But the true artist aims to help, and not to hinder, nature. Even the broadest landscape can be improved—that is, adapted to human use and enjoyment if it is treated in a reverent spirit. We do not attempt to thwart nature when we open her thickets and help magnificent trees in their development. We are working with nature if we encourage a screen of foliage deep enough to exclude the intrusion of some disagreeable object, or if we open vistas which will uncover to us the sky-line made by a mountain range. Nature alone does not spread out for us broad stretches of meadow, but if we come to her aid she will give to us all the turf we need. That is, the real artist emphasizes and intensifies here or subdues and qualifies there. He uses the art that mends nature, working in harmony with, and not against her. This truth is not thoroughly comprehended by persons who consider the true work of the land-

scap-gardener to be the planting of flower-beds and of ornamental shrubs. But, after all, it is this broad and catholic art which alone is satisfying everywhere, and which is just as useful in the preservation of the Yosemite Valley or the scenery of Niagara as it is in planning a pastoral park or the grounds about a country house.

A YEAR ago we gave some account of the farming on vacant lots in this city, carried on under the direction of the New York Association for Improving the Condition of the Poor. The experience of another year confirms what we then asserted, namely, that there are many destitute people in the crowded districts of this city who are not only willing to support themselves, but who can earn a living if they are allowed to use land which now lies idle and unproductive. These tenement-house farmers work under the instruction of experts trained and schooled in agricultural theory and practice, so that they really cultivate their land in accordance with the teachings of science. It thus happens that besides gaining some support they are actually learning an honorable trade, and learning it in a more direct and practical way than if they were attending a school of agriculture. Last year the women again proved the best farmers, and again the mothers were delighted at the opportunity of taking their children out of the stifling tenements and giving them an actual taste of country life. Besides this, it is a great advantage to people who are unskilled and unemployed to be lifted up to a place where they can think for themselves and have their dull mental processes stirred up and made helpful. As they begin to sell their material they quickly learn the important lesson that quality commands price, and as they are brought into actual connection with the working world and are encouraged to hope that they may become self-supporting members of society this schooling in the ways of actual business is invaluable. The reason why vacant-lot farmers can support themselves on the products of a comparatively small area is that they sell directly to the consumer. Small bunches of radishes, tastefully arranged and carried in a basket among the tenements, will bring two or three times as much as the same product nets the grower who sells at wholesale. How well some of these people cultivate their varied crops and how effectively they can display them was shown at the American Institute Fair last autumn, where one woman exhibited thirty-five kinds of vegetables, all well grown and all arranged with singular good taste. This collection well deserved the award it received by the unanimous vote of competent judges.

This year the work has started once more in full vigor. Provision has been made for helping a hundred families, and a hundred other applicants were turned away because it was not possible to secure land under favorable conditions. The fact that almost the entire list of vacant-lot farmers this year are novices does not show that the people who took up this work the year before became tired of the experiment because they had failed. On the contrary, it is a fact that the greater proportion of those who once cultivated vacant lots have gone beyond the need of this help. They have been encouraged and enabled to secure steady and remunerative employment, and some of them have abandoned the tenement-house regions for a life in the country. The educational feature of this enterprise is the most interesting part of it, and if it broadens out under the present judicious management as it promises to do, there is no reason why the greater portion of the vacant land that is arable and idle in the suburbs of our cities should not be brought under cultivation. The result will be not only that the necessities of many destitute men and women will be met, but these people will learn that there is a more natural and happy life for them outside of the slums, and that they can make a living in the country by using the knowledge they have gained in these summer schools of practical agriculture.

Three New Jersey Pines.

A RATHER hurried trip through southern New Jersey for the study of forest fires, under the auspices of the State Geological Survey, recently took me, with my traveling companion, Mr. H. S. Graves, through the fire-devastated south-eastern portion of the state. Aside from the main results of the trip, which must be reserved for a report to the next Legislature, the excursion yielded the following notes on three of the New Jersey Pines:

PINUS RIGIDA.—The power of this tree to sprout from the stump has been well known hitherto, but it has been generally supposed that the sprouts perish in early youth, never attaining merchantable size. This ability to coppice freely is mentioned by Mr. B. E. Fernow in an article in No. 405 of *GARDEN AND FOREST*, but the size to which the sprouts attain does not seem to have been definitely described. Southward from Lakewood and Toms River, on the barren, sandy, burned portions of the state, these sprouts of *Pinus rigida* are exceedingly common. In the larger specimens, which commonly reach a diameter of six to eight inches, breast-high, from two to five sprouts from the same stump are usual, while those of younger growth are often much more numerous. The life and proportions of the sprouts, like those of the less numerous seedling trees with which they were associated, were so limited and restricted by the frequently recurring fires that I was able to form no judgment of the maximum size to which they may attain. In every case noted the parent stem had been destroyed by fire, not by the axe. This fact, taken in connection with the habits of this tree observed elsewhere, may indicate a possible connection between this unusual sprouting power and the sandy soil and frequent fires of southern New Jersey.

The same capacity to sprout is shown also in the very numerous suckers which cover the trunks and the trunkward ends of the branches of trees whose leaves have been completely burned off, and whose smallest twigs bear marks of fire (see page 195). I am acquainted with no other tree whose capacity to recover after such treatment compares with that of *Pinus rigida*, although I do not know how durable that recovery may be. The oldest suckers examined had been on the tree but three years.

PINUS ECHINATA.—So far as I am informed, sprouts of this tree have not hitherto been noted. Near New Lisbon, in the central part of the state, they were quite common, though of small size, while at Lakewood and elsewhere larger trees, which appear to be sprouts, but of which the origin is still uncertain, are often conspicuous. Great numbers of little sprouts occasionally spring from small fire-killed trees at the surface of the ground, as happens so frequently with *Pinus rigida*, and stumps bearing a number of vigorous living sprouts of some size were also found. The power to sprout from the stump has not, until now, been known to belong to any of the two-leaved Pines in America, nor have I learned of its existence among these Pines in any other region. The five-leaved Pines do not sprout, and among the three-leaved American Pines only *P. rigida* has, so far as has been reported, this power. The freedom with which in certain localities both these trees, but especially *P. rigida*, send up sprouts after a fire, leads to the suspicion that these cases may be less isolated than they appear. It seems not unlikely that further search would result in extending the range of the sprouting capacity of *P. echinata* to other regions, and possibly in finding parallel cases among species whose coppicing power is not yet recognized.

PINUS TEDA.—This tree does not appear to have been reported previously from New Jersey. A single specimen, found on this trip, is growing on the Price farm at Town Bank, on the west side of Cape May, about three miles from the bathing beach and the great hotels. It stands alone, on pure white sand, two or three feet above the fresh-water lagoon, which here, as elsewhere, lies directly behind the moving sand dunes of the shore. The old

whaling town of Portsmouth formerly stood on this land, but its site is now partly under Delaware Bay and partly covered by the sands. The tree is about ten inches in diameter, breast-high, and perhaps twenty-five feet in height, vigorous, wide-spreading and evidently in strong health. Its identification as *P. Tæda* has been confirmed by Mr. Jack, of the Arnold Arboretum, who was kind enough to examine leaves, cones and fertile seeds gathered from the tree and forwarded for his inspection.

New York.

Gifford Pinchot.

The Hardy Flower Garden.

MR. A. HERRINGTON, gardener for H. McK. Twombly, Esq., Madison, New Jersey, read a paper on this subject before a meeting of the New Jersey Floricultural Society held at Orange. The paper was illustrated by some fifty colored plates of the best hardy plants. We reproduce, in a condensed form, the more important parts of this paper:

This department of the garden has, generally, the least consideration. A lawn is laid down, a few trees and groups of shrubs are planted, and the garden is made. If the luxury can be afforded, glass is indulged in. Many gardeners understand the cultivation of Palms, Ferns and Orchids, and know the latest introductions from the tropics, but they do not grow more than a small fractional part of the hardy flora of the temperate regions, and of the improved cultivated forms known in some of the best nurseries. Even in an extensive glass establishment only an infinitesimal portion of the tropical flora can be grown, whereas in the garden numberless good and hardy plants will flourish, from the tiny Saxifrage or vernal Gentian to the stately Lilies and sturdy Sunflowers of the prairies.

In home-grounds supposed to have a flower garden one is likely to find a little assemblage of beds, in stars or diamonds and other fanciful geometric forms, and containing a limited selection of plants, mostly tender, and often clipped and pinched into formal shape. The average garden is bald and bare in spring, waiting upon the elements to make possible the planting of tender summer plants, which eventually furnish a gaudy, monotonous display, to become a mass of black decay with the first frost in autumn, while nature's great garden all about us remains beautiful weeks afterward.

Our gardens and parks need never be flowerless except when the ground is frost-bound and all vegetation is dormant. The ideal garden, and the one which can easily be realized, is one which tells the story of the advancing or declining year, and whose blossomings denote the weeks and months as they come and go. In this latitude there should be spring gardens and summer gardens and autumn gardens. In the highways and byways in early spring the resurrection of floral life may be seen on every side, and the garden should awaken in the same way. The mountain plants, whose flowers succeed the melting of the snow, and the waves of verdure spreading over hill and plain teach the practical lesson that plants in the spring garden should not be coddled and given ceaseless attention in dug-up beds and borders.

Ten years ago I tried to express in an English garden my idea of nature's planting on a grassy slope half an acre in extent, where spring-flowering bulbs were disposed. These have increased each year and now make a beautiful and satisfying stretch of blossoms in the turf from January until June. Snowdrops and Snowflakes appear first, and in February Crocuses of many colors, and spreading colonies of deep blue Scillas and Chionodoxas. In March the bright flowers of the Dog's-tooth Violets stand up in tufts of marbled foliage and seem as much at home as in their native Alps. From March until June there is an unbroken succession of Daffodils, and I noticed, two years ago, a tuft with sixteen and another with seventeen flowers where a single bulb had been planted eight years before. Other flowers in this English garden are Apennine Anemones, Grape Hyacinths, Stars of Bethlehem and Fritillaries. Every year, according to the season, there is this combination and succession of bloom for four to six months, at no outlay beyond the first cost of planting, and with no care or attention. In July the slope is mown and kept as a lawn for the remainder of the season. This happy experiment of growing flowers in the turf suggests that stretches of grass need not be cut off close from early spring onward, and that patches under the leafless trees may be charming pictures of spring. This sort of gardening is infinitely more interesting

than the ordinary practice of setting out a few beds of Tulips and Hyacinths and drilling a few Pansies and double Daisies into lines and squares. But this is only one kind of spring garden, and another, quite opposite in character, can be made from the arrangement of flowering plants which need careful and persistent cultivation. Then, too, there are many beautiful perennials for the spring garden, such as the dwarf mountain Phloxes, Saxifrages, Sedums, Aubrietias, Arabis, Alyssums, Veronicas, Silenes, etc., with Epimediums, Primulas, Pulmonarias, Mertensias, Convallarias and dwarf spring Irises. Though many of these are alpine plants and natives of rocky ledges above the tree and shrub line, they are entirely happy and prosperous in gardens under right conditions. A miniature of a mountain range should, of course, not be attempted in the garden, but a delightful effort may be had from these hardy plants in rocky beds and borders, with the rocks subordinated to the needs of the plants, instead of the too common rockery in which the plants languish and die.

A great variety of hardy flowering plants are available for making a summer garden, and a careful selection will produce a picturesque and orderly effect during the entire season, and not be a heterogeneous mingling of plants without any unity or harmony. Entire beds are planted with Cannas, Geraniums and other conventional bedding plants, and if hardy plants were used in the same extensive way our gardens would not be colorless, as they have sometimes been described. Many tender flowering plants can be used to make the garden gay in summer, but we are not dependent on them, and they should not monopolize space which could be occupied by better plants. Instead of the little pattern gardens that admit of no variety in planting, and confine our attempts at gardening to one spot, the adaptability of hardy flowers should be studied, and they should be distributed in localities suited to them. The beds should be bold and the borders long and wide, with large groups of one kind of the best hardy flowers. For example, in an Iris garden an acre in extent all of this family could hardly be included, for there are Irises from Europe, Asia, Africa and America; Irises that do well in a wet ditch bottom, and at least one Iris that will grow on the house-top, and between these extremes an endless variety adapted to every soil and every aspect. There are Pæonies, Delphiniums, Pyrethrums and Day Lilies, each of which can be massed with striking effect. Occasionally a few of them are seen dotted here and there at regular intervals, but how often has any one seen them planted in bold, simple, natural groups?

Here again nature gives a lesson for arrangement in the garden. Along the waysides flower succeeds flower on any special area, through spring, summer and autumn, and plantings should be made in the same way in the garden. Many combinations of plants whose flowers succeed each other may be used on the same plot or tract. As a practical illustration I planted last fall some of the best sorts of tree and herbaceous Pæonies. These flower early and are soon past, with only huge tufts of spreading leaves remaining for the season. If Pæonies only were planted there would be no more color for the remainder of the season, and no flowers after Pæony time. But many bright and showy Lilies flower during summer and autumn, and while these flowers enjoy the warm sunshine the roots do best in cool earth and in partial shade; consequently I planted Lilies among the Pæonies. All will grow up together, and when the flowering season of the Pæonies is passed, their luxuriant foliage will help to keep the soil cool and moist, and be an admirable support and foil to the tall Lily stems when in flower. Many similar combinations are practicable, and instead of planting an entire garden each year, some of these plantations will continue for years, increasing in extent and beauty all the while. To be successful, the soil must be well prepared beforehand. A mere turning up of the upper six inches is not sufficient. For some hundreds of feet of hardy flower border made last year we trenched the ground thoroughly two feet deep and broke up the soil below that. Manure was worked in in the proportion of about one yard to six yards of soil. With a little feeding from the surface, plants will thrive for years in borders thus prepared.

There is abundant material, too, for autumn gardens, so that they need not be made up of the languishing remnants of summer. The autumn garden of nature is a calendar of this particular time of year in masses of Golden-rods and Asters, and our gardens may be a similar record of the season. The best of the wild Asters are not to be despised as garden flowers, and many lovely forms have originated under cultivation. On the prairies are perennial Sunflowers, and in the woods and fields close at home are rich, showy Cone-flowers worthy of garden space. The native and cultivated Phloxes,

too, in a hundred good varieties, are cultivated in commercial nurseries. The brilliant and imposing Torch Lilies, or Red-hot Poker-plants, are varied in size, the dwarf Kniphofia MacOwani having spikes two feet high, while the torches of the giant *K. nobilis* are higher than the head of a man, with other sorts of intermediate height. The profuse and enduring flowers of Japanese Anemones last until they are whipped to pieces and scattered by winter winds. With all these and Chrysanthemums, Crocuses and many more, the autumn garden may be distinct from the garden of other seasons, and have a character of its own which will be individual and fresh.

A garden to be interesting need not have long ranges of glass. To be sure, cheap glass has brought within the range of modest means the growing of delicacies for the table and of flowers for home use. But the range of plants cultivated under glass does not compare with the numberless hardy ones collected from the north and the south temperate zones and from mountain ranges, not to speak of those acquired by hybridization. Cheap glass has had the effect of directing attention away from outdoor cultivation, and too often hardy perennials are spoken of slightly. The brightest and most interesting garden that I know, and which is a changing picture during nine months of the year, has no glass house, and is a forceful plea for the satisfaction and success of the hardy flower garden.

Madison, N. J.

A. Herrington.

Entomological.

The Plant-house Aleyrodes.

ALEYRODES VAPORARIORUM was described by Professor J. O. Westwood in *The Gardeners' Chronicle* for 1856, page 852. Its occurrence in America was not recorded until over thirty years later, and it seems probable that the species was in some way introduced into America from Europe. Inasmuch as it is now found in such widely separated localities as Michigan, Kentucky and Connecticut, we may well suppose the insect to be well distributed, at least, over the north-eastern portion of the United States.

This Aleyrodes is found upon Strawberry-plants in the garden, but it is more especially in the greenhouse that the insect assumes the nature of a pest. The Tomato yet remains the chief host-plant of the parasite, though I have observed the larvæ upon the leaves of the Cucumber, Potato and Lettuce growing under glass, while among ornamental plants, *Ageratum Mexicanum*, *Abutilon*, sp., and *Maurandya scandens* were attacked. It has also been reported as infesting Roses, Geraniums, Coleus and Salvia.

Toward the end of the season the Aleyrodes is most abundant in the Tomato-house, and vast numbers of adults are often seen flying about the tops of the plants, near the glass, where they are mating and laying eggs. On the under surface of the leaves are the silvery white, bristly larvæ, which are without power of locomotion, except when newly hatched, and they subsist by sucking the juices from the plant.

The egg is oval and slightly conical in shape, with the larger end fastened to the under surface of the leaf. Two females were observed ovipositing upon Lettuce. The beak was first thrust into the leaf, and, depositing an egg, the female swung about, with beak still inserted in the tissues of the leaf, and serving the purpose of a pivot, continuing to deposit eggs in a circle of about one m. diameter. One circle contained six, and another nine eggs. Eggs are not always deposited in circles. I have frequently found them single and promiscuously scattered over the surface of the leaf. They are of a light green color at first, but soon change to a rather dark brown, and hatch in eleven days.

The young larvæ move about for a short time, during which they find a suitable place to insert their tiny beaks, so that they, too, can suck up the vegetable's juices for their sustenance. They are there permanently fixed until the adult stage is reached. The larvæ are nearly white and more or less transparent, with the edges and dorsal surface well covered with shining bristles. When the larva is full grown it becomes a pupa without visibly changing form; a little later the skin cracks open along the back, and the

adult comes forth. For development a period of about five weeks is required for each brood. Many cast pupa skins may be found upon the older and lower leaves of the plant where the larvæ were first to mature.

The adults resemble tiny white moths and are very beautiful when examined under the microscope. Both sexes are winged. An adult has four wings, each with a single median vein. The color of the body is yellow, that of the wings white. The abdomen of the female is thicker and plumper than that of the male. The body, wings and legs are covered with a white powdery substance, which was thought to resemble flour, thus suggesting the name Aleyrodes, which is from the Greek Aleurodes, meaning flour-like. The antennæ are six-jointed.

Entomologically the Aleyrodidae are intermediate between the plant lice (Aphididae) on one hand and scale insects (Coccidae) on the other, and are closely related to both. In fact, for a long time entomologists classed these insects with the Coccidae.

The genus Aleyrodes has not been well studied in this country, but was monographed by Signoret some twenty or twenty-five years ago.

One species infesting the Orange-tree, figured and described by Riley and Howard in *Insect Life*, vol. v., page 219, had been named Aleyrodes citri previously by Mr. Ashmead.

Aleyrodes vaporariorum is mentioned by Professor L. H. Bailey in Cornell Experiment Station Bulletin 28, page 58, as being a pest of the Tomato-house. Professors H. Gar-

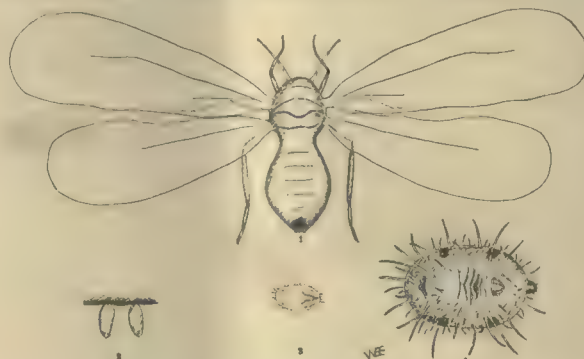


Fig. 23.—Aleyrodes vaporariorum, Westwood.
1. Adult female. 2. Eggs. 3. Recently hatched larva. 4. Full-grown larva.
All magnified 21 diameters.

man,* of Kentucky; G. C. Davis,† of Michigan, and A. S. Packard,‡ of Rhode Island, write of the plant-house Aleyrodes under the name of *A. vaporarium*. *A. vaporariorum* is the correct name, because it is the one given the insect by Westwood in the original description. There is, of course, a possibility that the two insects are not identical, yet they are supposed to be the same species. The discrepancy in the spelling of the specific name is doubtless an oversight.

Fumigating with tobacco will kill the adults in the greenhouse, and this is unquestionably the best way to keep the insect in check. The larvæ upon the leaves may be destroyed by applying a solution of whale-oil soap. Kerosene emulsion is used with success against Aleyrodes citri upon the Orange-trees in the southern states.

The figure on this page shows the insect in the adult, egg and larval stages.

Agricultural Experiment Station, New Haven, Conn.

W. E. Britton.

Cultural Department.

The Hippeastrums.—IV.

HYBRIDS—CONTINUED.

ALARGE number of gigantic hybrids of the finest form and beautiful colors have recently been introduced by Mr. E. H. Krelage, of Haarlem, Holland. Just now (April 10th) the following are in flower with me: Geier Wally, rosy white ground,

* Annual Report Kentucky Agricultural Experiment Station, 1890, p. 37.

† Insect Life, vol. vii., p. 174.

‡ Guide to the Study of Insects, 9th edition, pp. 526 and 712.

lined and penciled with crimson; segments broad and well formed and flowers well opened, very symmetrical and large; scapes about three feet high, contemporary with the leaves; each stem bears four delicately fragrant flowers. Noble par Mérite, white ground, slightly veined and striated with red; flowers large, of good form and substance, slightly fragrant; stems thirty inches high, each carrying four flowers. Jeanne d'Arc, white, lined profusely with red, greenish in the tube; very floriferous and a strong-growing hybrid. These hybrids compare well with the others now in flower with me. They are vigorous growers and easily managed. The scapes are usually three feet high. The form of the flowers, the narrow-

belong to the less beautiful, narrow-petaled *Hippeastrum vittatum* strain, but Mr. Pfister has lately grown a large number of the vigorous kinds, using for this purpose some of the best forms raised by Messrs. Veitch and Mr. B. S. Williams. From the good hybrid Dr. Masters, fertilized with the pollen of the best forms of *H. pardinum*, Mr. Pfister has raised a large number of seedlings. Three of the finest he named Ruth, Esther and Marion. They are of symmetrical form, their ground-color is light, and they are profusely spotted and clouded with different shades of red. Like Dr. Masters, they flower when quite small. He also succeeded in raising a deep rosy flowered hybrid with only a few traces of greenish toning



Fig. 24.—New growth, one year old, on *Pinus rigida*, after the destruction of all green leaves by fire.—See page 192.

channeled leaves and color of the bulbs show that Mr. Krelage has had a way of his own in producing these grand hybrids.

In this country Mr. W. Otto Groner, of the Rock Island Arsenal, has raised the finest forms of *Amaryllis*. From many hundred seedlings he selected only four, which he named the Koh-i-noor, with very broad segments of a deep glowing red, with a greenish white star and yellowish lips; Modjeska, Barbara Pomfret and Beethoven. With the exception of the last named, these hybrids are rather hard to deal with, and great care is necessary in order to keep them in good health.

The largest collection of *Amaryllis* in this country has been brought together by Mr. Henry Pfister, head-gardener of the Executive Mansion, Washington, D. C. Most of the hybrids

at the base of the tube. This has been named Mrs. Cleveland. In the greenhouses of the Executive Mansion the beautifully foliated autumn-flowering *Amaryllis*, such as Mrs. Garfield and Mrs. William Lee, are grown to perfection.

Just now a large number of my own exceedingly vigorous *Amaryllis* hybrids are in flower. They are refined in form, brilliant in color and of a luxuriance rare among the common strain of *Amaryllis*. There is nothing in the whole floral world that can compare with these royal plants. By careful selection of the most beautiful and vigorous English hybrids that were awarded certificates of merit by the Royal Horticultural Society and the Royal Botanical Society of London, and such kinds as were pronounced the most beautiful of the Continental collec-

tions, and which are certainly the most expensive, I have succeeded in raising a strain equal and often, as I think, superior to the best forms now in existence. As the most beautiful and symmetrical kinds, such as Brilliant, Chelsoni, Madonna, Clorinda, John Heal, Mrs. Burbidge and Leopoldii, are mostly weak growers and difficult of cultivation, I only use them as pollen plants, never as seed bearers. With them the most robust hybrids are crossed, and I have been fortunate in raising strong-growing, floriferous and gorgeously colored kinds. Some came into flower in three years, and most of them in four years from the seed. It is tedious and often disappointing work to hybridize these plants, as scarcely ten per cent. will ripen their seed. In most varieties the seed-pods swell and promise to give a good harvest, but suddenly, after four weeks' growth, they shrivel and disappoint the enthusiasm of the cultivator. As a rule, the coarse-growing and valueless kinds produce seed freely.

I have invariably found that *Amaryllis* grow much better and are far more satisfactory as window-plants and in the small greenhouse of the amateur than in the great commercial establishments. They are not quickly raised and easily sold. It takes four years mostly before they come into flower, and during their growth—that is, from the time when they show their flower-buds until late in autumn—they require the best places in the greenhouse. If neglected only for a short time they are almost lost, and once in bad health it is difficult to restore them to their former luxuriance. They require the loving care of the grower at all times, whether resting or growing. For this reason *Amaryllis* will never become a florist's flower, but it is a most desirable plant for the amateur and window gardener, for the wealthy private flower lover, and for the greenhouses of parks and botanical gardens. In such institutions *Amaryllis* are indispensable and should be grown in unlimited quantities. Scarcely any other plant is so easily grown as these if their few requirements are understood. They need a season of rest in winter, when water must be entirely withheld, or only sparingly and judiciously applied. During their season of growth in spring and summer they need abundant moisture, being particularly benefited by water in which a small amount of superphosphate has been dissolved. Manure-water is also a good stimulant. I keep the more delicate hybrids in the greenhouse the year round, while the strong-growing kinds are planted out in open hot-beds late in May, and in October they are again potted and transferred to the greenhouse. I use a soil of equal parts of loam, old cow-manure and sand, to which crushed charcoal and old plaster or a little lime is added. As soon as the robust-growing kinds lose their leaves they are placed under the benches with no water at all until they show their flower-scapes late in January or in February, when they are watered a little and set in a warm, sunny place on the benches. When the scape has grown a few inches and the foliage appears, the plants are thoroughly watered about once in ten days. The more delicate sorts, as well as *Hippeastrum aulicum* and *H. reticulatum* and its progeny, must be carefully watered throughout the winter and the soil should never become dust-dry.

The finest named hybrids of *Amaryllis* will always be expensive plants, as they are exceedingly slow in multiplying. Empress of India has been in my possession ten years and I have only a stock of four plants. Fertilized with its own pollen it does not come true, the seedlings being less beautiful in form and color. *Laurens* Koster, *Mozart*, *Conqueror*, *Leopoldii*, *Madonna*, *John Heal* and others are now seven years under my care and I have not succeeded in obtaining one single offset. *Pardinum luteum*, Mrs. Burbidge and *Solandiflorum conspicuum* I have had for more than twelve years and they have not produced a single side bulb.

Most of the *Amaryllis* seen in cultivation are hybrids of *Hippeastrum vittatum*. Of this strain the late Mr. Souchet, of Fontainebleau, France, and especially Mr. Martin Hoffmann, of Berlin, introduced many striking hybrids. They often came into flower in two years from the seed. They are always characterized by narrow, pointed segments and mostly an overabundance of green in the tube, but they stand a good deal of rough handling among other greenhouse plants, and are therefore usually preferred by florists. But they cannot compare with the magnificent hybrids I have named.

Milwaukee, Wis.

H. Nehrling.

The Hardy Plant Border.

ALONG the front row of the herbaceous border large patches of the Moss Pink, *Phlox subulata*, now make imposing masses of color. For a dry, sunny position this is an excellent plant, its evergreen prostrate stems providing a thick mat which completely hides the ground. Now the stems are quite hidden

from view with the profusion of blossoms. *Stellaria Holostea* is a good companion to the *Phloxes*. It is a plant that quickly spreads and needs frequent trimming to keep it within its allotted space. It has a low decumbent habit, and its flowers are produced in dichotomous cymes and measure about three-fourths of an inch in diameter. The drooping blue flowers of *Polemonium reptans* add a decided and distinct color to the edge of the mixed border where the white flowers of *Arabis alba* and *Stellaria* are abundant, and the pink tints of *Phlox subulata* and *P. procumbens*. This *Polemonium*, which is creeping in habit and has pinnate leaves, when in blossom is about eight or ten inches high. A good rich light soil suits it well, and it thrives here in a sunny position. *Erysimum pulchellum* is an exception to many of the weedy species of this genus and makes compact plants about a foot in height, with pretty sulphur-yellow flowers. It thrives in the rock garden and also does well in light rich soil in the front of the mixed border.

The summer Snowflake, *Leucojum æstivum*, is well worth a place in our gardens. The foliage of this bulbous plant resembles that of the *Narcissi*, and its dainty white Snowdrop-shaped flowers are borne in small drooping clusters on stout erect stems from fifteen to eighteen inches in height. The individual flower has six perianth segments, each delicately tipped with green. The plant is hardy here. Bulbs are procurable in the fall, and if planted then will blossom the following spring. It thrives in a light rich soil, and in Europe, from whence it came, it is frequently planted in the grass. *Muscari neglectum* has been grown here for a number of years as easily as the common Grape Hyacinth, *M. botryoides*, and a small bed is now attractive with its numerous racemes of deep blue flowers on scapes about nine inches in height. This south European plant flourishes here in light rich soil in an open position. The beautiful *Epimedium macranthum*, brought from Japan to Europe in 1836, grows about a foot high. Its leaves are bipinnate, and the white flowers are produced in short, close racemes. It is a good stock garden plant, and many of the *Epimediums* are useful under trees where herbaceous plants can be grown with only partial success. *Aquilegia Canadensis* is always graceful and pleasing and is as happy in the rock garden as when growing wild in rocky clefts on steep hillsides. The decumbent stems of *Euphorbia Myrsinites* make a graceful draping in the rock garden. When not in blossom this plant is pleasing for its distinct light green glaucous leaves, which make it noticeable even from a distance. This *Euphorbia* is now flourishing, and umbels of yellow flowers are borne at the ends of the stems. Although a native of southern Europe it is hardy here without any protection. The finest yellow flowers now seen out-of-doors are those of *Alyssum saxatile*. This plant, while desirable for use in borders, never gives the satisfaction it does when grown in the rock garden, where its stems are so disposed as to show off the dense masses of golden flowers to the best advantage. It enjoys a sunny position and the bright flowers are most beautiful in the sunlight. A few bulbs of *Tulipa Greigi* have been grown here in the same place without being disturbed for eight years. If planted where water will not lodge about the bulbs in winter they are perfectly hardy, and if not moved often they will flower each spring. *Tulipa sylvestris* is a species well worth growing. It soon naturalizes itself among the rocks and stones, and its showy, clear yellow flowers are refreshing and satisfying.

A choice and hardy plant for the rock garden is the beautiful *Hutchinsia alpina*. This neat, compact, dwarf plant has small shining leaves and pure white flowers, produced abundantly in clusters close above the foliage. An open position and a light soil in an elevated part of the rock garden seems to suit its needs. The hardy perennial, *Corydalis nobilis*, a Siberian plant, is pleasing when in flower, but has the fault of not increasing rapidly. The plant in bloom now is ten or twelve inches high, and its stems are thickly clothed with glaucous bipinnate leaves, the flowers produced in a dense cluster at the end of the stems. The flowers are of a rich golden yellow, with a small reddish chocolate mark in the centre. The creeping Forget-me-not, *Omphalodes verna*, grows luxuriantly to a height of six to eight inches under the shade of some Hemlock-trees. This charming plant bears handsome deep clear blue flowers with white throats, and its stems are clothed with deep green, ovate-cordate leaves. It increases by runners, and when once established soon covers a piece of ground.

On bright sunny days the object most admired by visitors to the Botanic Garden is a fine patch of *Anemone nemorosa*, var. *Robinsoniana*. This lovely plant does not open its flowers on dull days. The flowers are much larger than those of the

species and are of a delightful sky-blue color. Self-sown plants of the Iceland Poppy, *Papaver nudicaule*, are giving a plentiful crop of yellow cup-shaped flowers now. The flowers of the white variety harmonize well with the yellow ones when they are grown together.

Harvard Botanic Garden, Cambridge, Mass.

Robert Cameron.

Seasonable Flower Notes.

MARGUERITES are indispensable among the flowers grown for cutting. Their cultivation is easy, constitution robust, and they are almost free from disease and insect pests. With proper treatment Marguerites may be kept in bloom the year round. Old plants which flowered during winter before last when turned into the garden furnished flowers all summer long, though they were rather small. Finer flowers are obtained from young plants, and for winter blooming a fresh lot is raised in the spring and grown on during summer in the garden. Growers of plants for market usually keep them in pots, as they do not lift well, and, besides, with unrestricted root-room they become too large. Marguerites form a conspicuous feature of the display with Azaleas under canvas at Mr. H. H. Hunnewell's place during late May and early June. The kind best suited for growing into bushes such as are used here is the glaucous-leaved type, with finely cut foliage and small flowers. In two or three years they make very large bushes. They are carefully trimmed after the display is over, plunged in pots in the garden and kept from blooming for the remainder of the season. They are gross feeders and respond to liberal treatment. Specimens grown solely for a spring display are kept in cool houses during winter until a few weeks before they are wanted in bloom.

For winter cutting we have found Halleri major the best white; it has large flowers with long stems. Usually we have cut the flowers off singly, but last winter we commenced cutting them in sprays, giving a foot or so of stem. When a plant had been cut over it seemed as if all the flowering shoots had been taken. We obtained just as many flowers in the long run, and could begin to cut again from where we started to cut in about ten days. Sprays with foliage can be used with better effect and last much longer. The unopened buds develop in water, and with a little trimming over we have kept flowers for two weeks.

We have a yellow variety known as Halleri, though it cannot be correctly named so, as it differs but slightly from Etoile d'Or. It is free, however, and that is a quality rare in yellow varieties, so far as my experience goes. During a recent visit to Denys Zirngiebel's establishment at Needham, Massachusetts, I saw a large number of Etoile d'Or blooming splendidly. This stock was imported from France recently, and it is claimed to be an improved type and superior to the variety generally grown in this country under that name. We shall be fortunate if we find it a free-blooming variety and of good constitution, as a yellow Marguerite is badly needed. I found the new giant Californian also in bloom. That the plant, at least, will be a giant, there is not much doubt. The flowers are larger, but the increase in size is rather in the disk than in the length of the ray-florets. It is just about the size and has the general appearance of our common field Daisy.

The double form of the annual *Chrysanthemum coronarium* has come to be known as the double Marguerite. But common names which carry a wrong impression should be avoided.

The popularity of the modern French Pansies, distinguished for their large size and gorgeous coloring, is due to the efforts of Mr. Zirngiebel, who is a specialist in these as well as Chinese Asters. His intimate acquaintance with Bugnot, the famous French raiser of the type which is known by his name, has enabled him to procure seeds of the very finest strains. He is always careful to tell the visitor that he paid \$80.00 for the first ounce of seed he bought of the popular Trimardeau. Finding it moderately hardy, he improved the opportunity to select the hardiest and best colors for perpetuating, and it is probable that Zirngiebel's Trimardeau is the type of all the "own" and "selected" stock now offered throughout the country. It was hardly to be expected that the tender and highly bred browns and reds so common in the genuine Bugnot strain could be merged with the Trimardeau. It has been done, and this season, to purple, white and yellow, will be added brown colors. The Pansy is now a profitable flower for florists.

The two new Hybrid Sweetbriars, named Lord and Lady Penzance, have stood well at Mr. H. S. Hunnewell's place in Natick. They are as hardy as our Prairie Rose. *Syringa Ja-*

ponica is showing well for bloom and promises to be earlier than last season. The specimen here has reached the dimensions of a small tree, and evidently a mature specimen will grow to be forty feet in height. Flowering Thorns, Plums, Apples, Quinces and Cherries are represented here in large numbers. A set, at least, is kept in one quarter of the garden for convenient study as well as effect. *Berberis Aquifolium* on a north-east slope is full of bloom, and with foliage of classic cut it makes an elegant bush. It will not stand bright sunshine in winter, as might be seen by one bush farther to the south being somewhat burned. A splendid patch of *Daphne Cneorum* is evidently suited on this north-east slope. It is seldom we find this handsome trailer free from winter-killed branches. The delicious odor from its lovely pink blossoms filled the air in its locality.

Wellesley, Mass.

T. D. Hatfield.

Flower Garden Notes.

WITH a garden of flowers judiciously planted, there is no period more interesting than the present when all plants are coming on rapidly and many are at their best bloom. The mixed border of bulbs, perennials and annuals makes up the ideal combination that will give flowers from April until October, a result not to be gained in any other way, and at the same time it is the most economical way of filling a border, for few plants need replacing each year except the annuals, and the most of the labor lies in weeding out such as are encroaching on their near neighbors; there are always many of these, and a good time to see to it is the present. Seedlings are the most troublesome, perhaps, and these can easily be detected now before they gain vigor. Larkspurs and Phlox are particularly prone to reproduce themselves, and they are almost invariably inferior, and, unless they are really needed in the border, should be pulled up without hesitation. The newer race of single tree Pæonies have wintered well and seem reliably hardy. There were some that never took kindly to the new conditions last year, and these have died during the winter, but the remainder are well set with flower-buds, which will in a few days open about the same time as *Pæonia tenuifolia*, *P. Wittmanniana* and *P. corallina*, all of which are early-flowering species and valuable at this time of year.

It is a matter of surprise to me each season that there are not more of the species of Tulip planted in gardens for permanent effect. Their beauty, hardiness and longevity are all beyond question and look well mixed. The Parrot varieties, the forms of *T. Gesneriana*, *T. elegans*, *T. cornuta*, *T. sylvestris* and many more, are all thriving better after a five years' residence than if they had been newly imported from Holland. It is true they have all been lifted twice and replanted, but this was necessary owing to the way the bulbs had increased; but, apart from this, no other attention has been given. Oriental Poppies are also planted through the Tulip bed, a large one, and these will flower in June. All are seedlings from the true blood-red form known as *Papaver bracteatum*, and we find it comes true from seeds when taken from isolated plants. The Poppies in their turn will die down soon after the Zinnias are set out between the Tulips, and we shall have good effects from these in late summer until frosts arrive. There are no annuals that are so satisfactory as the Zinnias taken in all respects. No insect pests devour them, the flowers are admirably adapted for house decoration when cut, and they are easily raised from seeds. To get the young plants started well, however, they should be planted out on a mild hot-bed from the seed boxes, such as are used for growing on early vegetables. It is difficult to get good strong plants by June if they are set out on a cold bottom.

The Narcissus season is about past now; only a few of the Poet's varieties remain to open, and these are naturalized in the orchard under Apple-trees, where the white starry flowers seem peculiarly suited. They thrive well here, too; better, indeed, than in the border under richer soil and cultivation. The more robust Trumpet varieties do not do as well in the grass; they enjoy more nourishment, and will give correspondingly better returns. If the crop of flowers has been poor this spring, it is a sure sign of deterioration, and will probably be caused by overcrowding of the bulbs; ours all had to be transplanted last fall, and had been left a year too long. We did not get the amount of flowers this spring that the bulbs ought to have produced, and those that were potted up for forcing did not flower well. Next fall, however, they will be in fine condition to lift for winter blooming, and ordinarily home-grown bulbs give much better returns than those grown in Holland, and they can be had in bloom earlier.

We have been much pleased with the Burbank Canna. It is

very similar to Austria, but has more substance, is dwarter, and seems to have broader foliage. We have had a good opportunity to compare them, as we had the two, with Italia, in bloom at the same time. The trio will make valuable plants for flowering in the greenhouse in pots or tubs, and there is no doubt a place for them, even if they are not adapted to outdoor culture, as with the Crozy race.

Another very pretty novelty of this season is the so-called yellow Soupert Rose Moselle. It is extremely double, with a pretty apricot-yellow centre. Now that it is well known what admirable bedding Roses the Soupert Roses make, the Moselle will be a decided gain for summer bedding. The Roses of this race bloom perpetually in the open ground until frost, and their hardiness is undoubted.

South Lancaster, Mass.

E. O. Orpet.

Xanthoceras sorbifolia.—This beautiful little tree is just now the pride of our grounds (see vol. vi., p. 285). It has an erect habit and is now ten feet in height, and so completely covered with bloom that scarcely any of its very handsome dark green pinnate foliage is visible except a green spray here and there to give relief from the dazzling beauty of the flowers. These are large, upright, five-petaled and bell-shaped, and they have the unusual quality of changing their appearance day by day. When they open they are white with greenish centres, and the lower ends of the petals are marked with veins of lemon-yellow. By about the second day the petals have spread apart, showing more plainly the green calyx, and the veins have deepened to brownish yellow. About the third day a still more singular change takes place. The yellow has become a beautiful shade of pink, the green ovary swells and becomes conspicuous, and by about the fourth day the flower has utterly changed its character, as the veins and lower end of each petal are now a deep and beautiful shade of red, an indescribable color, very rare in nature. Meanwhile the petals have continued to spread apart, showing between them the green divisions of the calyx, and these changes, together with the swelling of the now prominent ovary, give the flower a totally different appearance from that which it presented at the time of its opening. On the spray which I now hold in my hand all the changes I have described can be noted at the same time, as some of the lower blossoms, which are persistent, are about four days old, and those at the top have just expanded. The individual blossoms are on long foot-stalks, and these are each ornamented with three green ovate bracts where they join the parent branch. The *Xanthoceras* seems to be perfectly hardy, and deserves a choice and conspicuous place in the shrubbery where it can have room enough to develop without being crowded. It has a single stem and is more like a small tree than a shrub. It is said to attain to the height of fifteen feet in its native country. Here it seems to find congenial soil and grows rapidly.

Rose Brake, W. Va.

Danske Dandridge.

Correspondence.

The Red Cedar.

To the Editor of GARDEN AND FOREST:

Sir,—I read your article of April 14th and that of "H. S. H." of Wellesley, Massachusetts, in your issue of April 28th, recommending Red Cedar for more general ornamental planting, with interest. Three years ago I had arranged to transplant a number of young Red Cedars found in old pasture-fields in western Pennsylvania to one of our parks at Youngstown, but chanced to read Bulletin No. 92 of the North Carolina Agricultural Station, published in August, 1893, before doing so, and upon the representation of the author, Professor W. F. Massey, horticulturist of the above station, that Red Cedar caused apple rust, and that the best remedy for the rust was the destruction of all Red Cedars within a mile of Apple orchards, reluctantly abandoned the idea.

From page 86 of the above bulletin I quote as follows:

"Rust of the apple is one of the worst diseases this fruit suffers from throughout the southern states. It is especially bad in sections where the Red Cedar abounds. This disease is caused by a fungus which, unlike all other fungi parasitic on tree fruits, is bimorphic—that is, it exists at different seasons in two very distinct forms and on different hosts. The form on the apple 'rust' is botanically known as *Roestelia pirata*. The other form affects the Red Cedar, producing the so-called 'Cedar apples,' and is botanically known as *Gymnosporangium macropus*. The apple form or 'rust' is the immature form of the Cedar form. The fungus appears to be

restricted to these two naturally widely separated genera of plants. Hence, if all the Red Cedars, *Juniperus Virginiana*, within a mile of an Apple orchard are destroyed, no mature forms or reproductive spores of the fungus can be formed, and no further infection of the orchard can occur. The destruction of all Red Cedars within a mile will, in most cases, prove a complete remedy for 'rust.' When winds are unusually strong the mature spores may be carried for over four miles, but ordinarily they will not be carried over one mile. But one or two Cedars, if overlooked, may breed spores enough to infect several orchards."

However desirable the Red Cedar may be for ornamental purposes, it ought not to be extensively used if detrimental to apple-culture.

Youngstown, Ohio.

Volney Rogers.

[This rust is more dangerous to Quinces than to Apples, and it seems to have been proved (see Bulletin 80, Cornell Experiment Station, page 627) that the spores from the Cedar apples can be carried by the wind eight miles, and that it may affect Quince-trees, Apple-trees or Hawthorns at that distance. Nevertheless, the disease is not so serious in our latitude but that it can be kept down by spraying with Bordeaux mixture. If we spray our fruit-trees for the scab fungus and other diseases as we should we shall not find the Red Cedar such an injury to orchards that we shall feel any desire to exterminate it. This matter was referred to Professor Bailey, who writes: "I do not feel as much alarm as I once did over bugs and fungi. I should not deliberately plant Red Cedars around a Quince orchard, but if I wanted Red Cedars on my grounds I should plant them without hesitation. Upon my own farm I am planting hundreds of Apple-trees, and there are many native Cedars standing about the place which I do not expect to destroy, although I shall do so if they become intolerable nuisances."

The New York Park Board is planting Red Cedars in Morningside Park. Of course, there are no orchards near enough to be in danger, but the Hawthorns and other trees of the Rose family may be injured by the fungus. Nevertheless, the time is coming when spraying for other fungi will be a general practice in park plantations as well as in orchards, and we have little fear from the Cedar apples. Indeed, it would not be a difficult matter to remove the galls as they appear upon the Cedar-trees. There is no doubt as to the fact that the Red Cedar is the propagating centre of a rust which in another form grows on members of the Rose family, but with our present knowledge of the means of keeping it in check we see no reason to abolish the Red Cedar either from parks or from private plantations.—ED.]

John Evans.

To the Editor of GARDEN AND FOREST:

Sir,—Dr. Harshberger has done good service to the early history of botany in the appreciative notice of John Evans, one of Philadelphia's famous botanist-gardeners. He has not overdrawn the picture of this modest, amiable and useful enthusiast. It is just fifty years ago, this blooming month of May, since Robert Buist, then in the prime of his career as a nurseryman, invited me to take a ride with him to see "a wonderful collection of plants by a farmer, who was also an excellent botanist." He drove to Evans' garden. Like many young men, I was inclined to believe I knew a good deal. But I was amazed at the great store of knowledge gained on that day's trip. The reference by Dr. Harshberger to the sawdust reminds me particularly of the lesson learned as to the love of the Raspberry and Currant for rotten wood, which for the first time I saw there.

That he gathered everything from the gardens around Philadelphia that could be obtained, the following little circumstance will testify to: While showing us his garden treasures nothing could exceed his enthusiasm. No trouble seemed too great for him in showing us everything that he thought would interest us. Mr. Buist was silent after entering the carriage on our homeward drive. After a long while he suddenly exclaimed, "Thomas, many a dollar that man has paid me for rare plants for his garden, but never again will I take money from him. He can have anything he wants from my place after this, and he shall not be charged a cent for

it." The story shows alike the goodness of heart of two men, both enthusiastic lovers of trees and nature.

Besides Bartram, Marshall and Evans, Corson deserves a conspicuous place in the well-deserved tribute of Dr. Harshberger.

Germantown, Pa.

Thomas Meehan.

Early Flowers.

To the Editor of GARDEN AND FOREST:

Sir,—In early April, GARDEN AND FOREST editorially intimated, very pleasantly, that those of us who insist on having early flowers in our gardens were braving the elements and courting pneumonia and sudden death, things not to be expected of the average owner of gardens. This scarcely represents either side of the case. The average gardener simply does not appreciate the fact that there are countless flowers of most exquisite beauty which flower early in the year, and that he very much misses his opportunities if he shortens his garden season several months. I mean by average gardeners here those who have some enthusiasm on the subject, not those hopeless people who in these early days of May are turning loose the jobbing gardener in their borders to destroy all living things and "tidy up." As for the growers of early flowers they have "lived through March" again, for, as a matter of fact, the work in such gardens was finished in the previous year and one had only to enjoy the results, and this does not lead to much exposure. It is not necessary to linger or dawdle over a flower to absorb its beauty. A glance is often enough to fill one's mind with a beautiful image and start one's imagination, and imagination is as useful to a gardener as a spade. And then the first awakening of plant life is a rare experience which we see only a few times in our short lives. The luxury of a garden to me does not consist in spacious plant-houses filled with tropical plants, or in the flowers more especially valuable for the market; these are only incidents of a complete garden which should primarily contain plants of all seasons growing in the freedom of nature. An ideal garden should, among other things, comprise a few low hills, with a ravine or two, and perhaps a brook. Shrubs one should always have, not only for the flowers, but for the shadows which they make. On these hills, with some shrubs, one could naturalize a host of dainty plants, worthy of the early year, which would tempt one to wander afield, and furnish always those surprises which add so much to the pleasures of gardening. In all but the point of view of the lover of flowers this is very impractical gardening, for many flowers would bloom unseen. Still, even then they would feed the imagination of the planter who could not, perhaps, enjoy sometimes the fruit of his labor at the moment. However, one does not require a large domain for gardening pleasures of this kind. The smallest garden may be so stocked, if one represses a desire for bigness and show, that one can daily discern something new, and often come across some lovely thing planted long since and forgotten in the absence of bloom. One learns in collecting plants not to expect everything to flower each year, and it is curious how many plants one accumulates which for one reason or another flower very infrequently or not at all. The great drawback to the cultivation of any but a conventional garden is the impossibility of securing intelligent help for those minor operations which one would prefer to pay for. Help is very expensive when it results in weeding out everything except familiar plants. The cultivation of dainty plants would not, of course, appeal to those who must hunt their pleasures with a fund.

Elizabeth, N. J.

J. N. Gerard.

Flowers at the Farmers' Club.

To the Editor of GARDEN AND FOREST:

Sir,—At the monthly meeting of the Farmers' Club of the American Institute, held Tuesday, May 11th, at 111-115 West Thirty-eighth Street, this city, there was a large and varied exhibition of flowers of hardy herbaceous plants and shrubs. The general subject for discussion was Hardy and Native Plants, and Dr. N. L. Britton, Director of the New York Botanical Garden, gave bibliographical notes of Dodecatheon, together with illustrations and herbarium specimens. Other speakers were Mr. S. B. Parsons, Mr. Samuel Henshaw, Mr. Husted, Dr. Ward, Mr. C. L. Allen, Mr. Leonard Barron, editor *American Gardening*, and Mr. Holloway, who stated his successful experience with Japanese Maples in an exposed position on Long Island. Mr. A. Herrington made a plea for the natural expression of trees and shrubs, and against formal pruning and clipping. Dr. Hexamer, President of the club, spoke of the charm of the hardy plant garden in its variety,

and said this is the garden for the home and the family and children, rather than for neighbors, and that it is a living kindergarten and nature's own garden. Mr. John Lewis Childs, of Floral Park, New York, had an exhibit of seventy-six distinct kinds of flowers, including *Viburnum lantana*, *Daphne Cneorum*, Meehan's *Halesia*, *Spiræas*, *Polemonium coeruleum*, *Tritelia uniflora*, *Iberis Gibraltaria*, *Jonquils*, *Lychnis*, hybrid *Aquilegias*, *Iris*es, *Erysimum pulchellum*, the red and yellow flowering *Currants*, with many of the Japanese flowering Apples and Plums. There were also several distinct strains of *Viola pedata*, one of peculiarly rich marking, and supposedly from the section of Long Island about Hempstead Plains, where these Violets are strongly established. Mr. James Holloway, Glen Cove, Long Island, showed a highly interesting collection in seventy-four vases, among which were *Azalea amœna*, *Elæagnus longipes*, *Kerria variegata*, thickly flowered *Cercis Japonica*, large clusters of the sweet-smelling yellow flowers of *Berberis Aquifolium*, *Sambucus pubescens* and *Berberis Sieboldii*, often called B. Hakodate; seven forms of Apples were included in this exhibit, the most showy being *Pyrus Parkmanni*, the more delicately colored *P. floribunda* and the large double *P. coronaria*. The only *Rhododendrons* shown were from G. J. Aitken, gardener to R. Cook, Esq., Bayonne, New Jersey. Mr. A. Herrington, gardener to H. McK. Twombly, Esq., Madison, New Jersey, had large sprays of *Cornus florida*, *Halesia*, *Judas-tree*, *Exochorda* and the red-flowering *Dogwood*.

Other exhibitors were William Turner, gardener to William Rockefeller, Esq., Tarrytown, New York; W. Anderson, gardener to J. M. Constable, Esq., Mamaroneck, New York, who sent three luxuriantly grown masses of white, pink and purple *Campanulas*; Mr. S. B. Husted, Blauvelt, New York, had a showy exhibit in twelve vases; several of the brightest masses were foliage of Japanese Maples and the Japanese *Judas-tree*. A. Grierson, gardener to Hicks Arnold, Esq., Rye, New York, who, with *Iris lupina*, *I. cristata* and *I. Korolkowi*, showed many of the best *Narcissi*, *Trillium grandiflorum*, *Summer Snowflakes* and the yellow *Doronicum Plantagineum excelsum*, besides a showy mass of Iceland Poppies and choice Tulips in large variety. M. A. Muller, Oasis Nursery, Westbury, Long Island, and Messrs. Siebrecht & Son also had interesting displays. Branches of *Xanthoceras sorbifolia*, *Epimedium*, *Colchicum*, English Cowslips and Wallflowers, *Alyssum saxatile* and single and double *Pæonia tenuifolia* were all seen. Mr. W. A. Manda, South Orange, New Jersey, exhibited a specimen of *Lilium longiflorum* with variegated foliage, and Mr. Barron showed a vase of the dainty little *Hoop-petticoat Narcissus*, *N. bulbocodium*. Mrs. C. S. Valentine brought an interesting collection of hardy cultivated and wild flowers gathered within the town limits of Cranford, New Jersey, including seven species of native Violets, Bellworts, True Solomon's Seal, *Pedicularis Canadensis*, *Arabis bulbosa*, Naked Broom Rape, *Podophyllum peltatum* and Pansies wintered out-of-doors.

New York.

M. B. C.

Recent Publications.

The Procession of the Flowers and Kindred Papers. By Thomas Wentworth Higginson. New York: Longmans, Green & Co. 1897.

One always picks up a book with a title like this with some apprehension. Men who consider themselves endowed in a greater or less degree with what is called a "feeling for nature" are apt to feel that the great mass of their fellow beings are less fortunate in this respect and need to be instructed as to what is going on about them. It too often happens, therefore, that a writer with very little imagination, no sense of humor, and a habit of taking himself seriously, feels moved to describe in a prosaic fashion what he thinks he ought to see, with the depressing results which are seen in countless books and magazine articles. This little book, however, is not a collection of such commonplace essays as those to which we have made allusion. The author is a man of scholarship, taste and literary skill. He is an original observer, and without making any pretensions to being a naturalist he describes what he sees with accuracy, and not infrequently his thoughts rise to the realm of poetry. The sketch entitled *My Outdoor Study* is perhaps the best of the half-dozen which the book contains, and is thoroughly enjoyable from beginning to end.

Notes.

The leaves on the young shoots of the Wild Cherry, which is found abundantly in the hedge-rows of every Long Island farm, are now so fully grown that branches for the decoration of fruit-stands are again in the market. The red stalks and midribs of the leaves, the rich color of the bark on the new growth, the delicate green of the glossy foliage growing lighter toward the tip of the branches, together with the grace of form and the silver-bronze tints of the half-grown leaves at the summit, make a singularly beautiful combination.

The permanent portion of the great Hamburg Exhibition is now about completed. The location is on undulating ground, and it will be decorated with thousands of plants of Azaleas, Rhododendrons and Roses, in bloom or in bud, with a great number of conifers, Hollies and other plants, grouped for effect. The first of the six special exhibitions began on the first of May, and the display was most imposing and extensive, filling all the available space in several buildings, the largest of which covers two acres of ground. The managers have expended half a million dollars on the buildings and grounds.

The prices of flowers were, perhaps, never so low in this city as they were last week, when carnations brought as little as \$1.00 a thousand, and a regular rate for roses was \$5.00 a thousand. Indeed, many of the highest-grade flowers could not be disposed of at any price. Besides the close of the social season, another reason for the slow sales is the abundant use of sprays of Lilac and other early spring flowers, both wild and cultivated, and flowering branches of trees and native shrubs for church and other decorations. These flowers are for sale by the armful on the street corners, or they can be had for the picking almost anywhere in the suburbs.

Professor Jordan, Director of the New York Experiment Station at Geneva, has concluded that many of the 25,000 persons on the list to whom his bulletins are mailed would be benefited by popular editions of those which consist largely of tables of figures and elaborate reasoning, or are expressed in the concise and technical language of science. These popular bulletins will be sent to the regular mailing-list, but the scientific or statistical bulletins will be mailed to any who desire to examine them. We have received four of these popular bulletins, which seem to have been admirably edited by Mr. Frank H. Hall, of the station staff. One of these is on Gooseberries, another on Spraying for the Plum and Cherry-leaf Spot, a third is on Alfalfa, and a fourth on The Ravages and Treatment of Cut-worms.

A correspondent of *The Country Gentleman* gives the information that the destructive San José scale which has been brought from California into eastern orchards, to the great alarm of fruit-growers, has met at last with a check in Florida. Professor P. H. Rolfs, of the Florida Experiment Station, discovered it in vast numbers at De Funiak, and in the course of his investigation he observed many dead scales on trees which had never been sprayed or treated in any way. He found that the mortality was due to a parasitic fungus which had attacked the scale and killed it. This morbid fungus is a native of Florida; it can be propagated artificially with ease in unlimited quantities and it can be applied with a spraying machine like other insecticides. If all this is true, Professor Rolfs' statement that the discovery of this fungus disease marks the beginning of a new era in the methods of fighting with this insect will readily be accepted.

Viburnum lantanoides was one of the many shrubs in flower at the Arnold Arboretum last week. The flat, Hydrangea-like corollas of the neutral flowers on the margins of the cymes are an inch or more in diameter, and appearing above the half-grown leaves are very effective. The plant is good at all seasons with its sturdy growth, its large leaves, its beautiful fruit, changing through coral-red to dark crimson or purple in autumn; it is really one of the most desirable shrubs or small trees in our North American flora. When grafted on *V. dentatum* it grows very well, but on its own roots it is not an easy plant to manage. Two other native shrubs of the north-eastern United States, which are rarely planted, were in bloom, namely, the Bush Honeysuckles, *Lonicera ciliata* and *L. cœrulea*. The first one, which attains a height of five feet, has rather large, greenish yellow flowers, borne in pairs, which are succeeded by bright red berries. The second, a smaller plant, some two feet high, has pale yellow flowers and blue fruit. Both of these plants are easily cultivated and are desirable in any considerable collection of shrubs.

The Alligator, or Avocado, pear, which is quite frequently seen in the New York market, is now grown largely in Ma-

deira, where it was introduced thirty or forty years ago. According to a late English Foreign Office report, the tree attains a height of from twenty to thirty feet in Madeira, making a tall, slender growth, and having smooth, green, Laurel-like leaves. Three to five of the pear-shaped fruits grow in a cluster and become a dark purplish brown when ripe. The pulp, which is often called "vegetable butter," is found between the thin skin and the globular seed. This is generally eaten as a salad, being seasoned with pepper and lime-juice, which is said to bring out the peculiar nutty flavor which is much appreciated by those who have acquired a taste for it. Others eat it as a dessert fruit with sugar as they do melons. The fruit is in season from the middle of September until the end of February, and is mostly consumed at home, although a portion of the crop is sent to England and to Lisbon. It is easy to export, but since the taste for it, like the taste for many other tropical fruits, is an acquired one, shippers only export it when ordered. The trees are propagated from seed, and the plants do not bear fruit until they have attained the age of from five to seven years.

We have received two inquiries from correspondents about the damaged foliage of young Norway Maple-trees, and they send specimens which seem to be blackened and wilted as if they were affected by some fungus or insect. Of course, without further examination we are not able to give the cause of the trouble, but some notes in the annual report of the Hatch Experiment Station of Massachusetts, just issued, may be of interest. Last year many leaves of the Sugar Maple in a dry and crisp condition were sent to that station for investigation, and the same condition was observed in different varieties of the Japanese Maple growing on the college grounds at Amherst. The leaves were wilted only on the west side of the tree which was toward the prevailing wind upon the day when they were affected, and this peculiarity seemed to extend all over the state on the 18th of May last. The wilting of the leaves which occurred quite generally through Massachusetts was evidently due to excessive transpiration of water, when the supply at the root was limited. The phenomenon was interesting, as it occurred on apparently healthy trees under unusual conditions, which lasted but a few hours. It is well known that the agitation of the leaves of a plant greatly accelerates the process of transpiration just as low humidity and a high temperature do. These were the conditions upon the day in question. Before the rainfall had been below the average, and there had been continued droughts during two preceding years. The supply of available water, therefore, was less than usual, and under a strong, dry, warm wind the leaves of a tree like the Maple, with a large surface, might be expected to become exhausted and wilt badly. When this wilting was not carried to excess the leaves recovered. When it went too far it resulted in the shriveling and death of the foliage. It ought to be remembered, too, that young leaves give off more water than older ones, and Maple leaves are transpiring their maximum quantity in May. The report goes on to say that if there had been plenty of water in the soil the high wind would probably not have caused wilting, or if the same conditions had occurred in August or September, when the foliage was mature, less wilting would have resulted. This spring there does not seem to be any great lack of water in the soil, and we do not know the precise day on which the wilting occurred nor the course of the winds. It is not improbable, however, that accelerated transpiration and lack of water-supply was the cause of the damage to the leaves reported by our correspondents.

John Saul, one of the oldest and most widely known nurserymen of the country, died at his residence in Washington on the 11th instant, at the age of seventy-four years. He was born in Lismore, Ireland, where he was trained as a gardener, and while still a young man took the management of a nursery in Bristol, England, after having lived for a time in the Isle of Wight. He emigrated to this country in 1851, and was associated with Andrew Jackson Downing in the planting of the Smithsonian grounds and other parks in Washington. In 1852 he established the business which he has conducted for forty-five years. Mr. Saul was an enthusiastic grower of Orchids, and he has furnished the best American gardens with many of their rarest and most valuable plants. He was Chairman of the Parking Commission of the District of Columbia, which during the last twenty-five years has done so much to beautify the capital of the nation with well-planted street trees. His attainments commanded the respect of the best horticulturists and pomologists of the country, and he was esteemed by all for the integrity, simplicity and purity of his life.

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One Way to Make Parks Attractive.

AT a conspicuous point on a hillside in the Arnold Arboretum there is planted a broad stretch of Forsythias, and about three weeks ago, when these shrubs were all in bloom, every visitor was struck by the great stretch of bright yellow which shone like molten gold in the sunlight. The Forsythia is a common shrub, and the only remarkable feature in this spectacle was its unusual extent, and the lesson it conveyed to every beholder was that a thousand Forsythias massed together on an acre of ground will make a much more striking display than the same plants would if scattered along a walk or a driveway for a mile or more. One would tire of such a blaze of yellow if it remained all summer long, but it burns out before it grows wearisome, and when the flowers have fallen all too soon, we think with pleasure of the remarkable pageant until the year brings around the flowering season again. If any one raises the objection that there is something spectacular or theatrical in planting of this sort, we must answer, as we have done before, that no one complains of nature for spreading out hundreds of acres of Rhododendrons on the summit of Roan Mountain, and, indeed, when one looks over this foreground at the great landscape beyond he sees nothing inharmonious in the picture. We do not tire of Dogwood-blossoms extending, like snowdrifts, for miles along a wood border in the middle states, or of ten thousand Red-buds in bloom at the same season, but we realize that these great combinations can produce effects which are marvelous in their impressiveness, and which ought to be repeated, if possible, in our great rural or semi-rural parks.

Of course, it is easy enough to overdo the matter in providing what are known as special attractions for visitors to the park. Playgrounds for games of various sorts, provision for skating or music and for museums of animals or plants have been introduced into parks, but they are to be commended only so long as they are held in strict subordination to the design as an artistic whole. It must be remembered, too, that the general landscape ought never to be marred by anything which conflicts with its motive, and great masses of flowers are not to be used without caution and judgment. But the wild flowers of any region,

for example, might be planted along the wood borders and in the glades of any park in such a way that they would not detract from its general beauty and would increase the attractiveness of its details. Besides this, such planting would serve a distinct educational purpose to all who are inclined to study their local flora.

It is in a line with this view of the case that we have in former numbers of this journal suggested that the borders of small park openings should be composed of shrubs which flower at the same time of year, one meadow being belted with shrubs which flower in early May, another one with those which flower a week or two later, and so on, so that there might be a series of gardens like a panorama showing their flowers one after the other, according to their season. In a large park system masses of a single shrub or tree could be used in sufficient abundance to be impressive when their flowers are open, and yet they might form so small a portion of an extensive view as not to interfere with the variety of the landscape when out of flower. Along one of the driveways of the Arnold Arboretum a hundred and twenty different varieties of the common Lilac are now in flower, and while such a collection has an educational value for all who care to study these plants, it has besides a beauty which can only be appreciated by those who have been privileged to see them. The material for such striking displays is almost endless, and it need not by any means be confined to flowers; trees conspicuous for the beauty of their foliage in spring or autumn could be grouped together, and every one who has seen a swamp in winter lighted by the scarlet berries of the Black Alder can readily understand how the bright-colored fruits of many shrubs can be massed impressively.

This general subject was suggested by the great number, variety and marvelous beauty of the so-called "flowering Apples," which were at their best a fortnight ago, and the spectacle which they presented again proved that they offer unequaled material for massing in large places. A double-flowering Peach, especially the one with scarlet flowers, is almost a startling object when in full bloom. There is also a double pink form with flowers almost identical in color with those of our ordinary Peach, and a white-flowered form which cannot be excelled for the purity of its color and the profuseness of its bloom. These trees, however, have no great beauty except during their brief flowering season, and in our northern states, even when the buds are not killed by early frost, they are subject to many diseases and the attacks of borers, and are short-lived trees at the best. The Plums, too, of various species are delightful small trees, but the Apples as a class are altogether superior for general purposes. Most of them have no off-years and are covered with flowers every May. They are perfectly hardy and long-lived. The flowers on the various trees differ much in color and in abundance, some of them completely covering the branches, and others, although borne in great quantities, are sufficiently scattered to show the softening effect of the light green of the young leaves. The plants vary greatly in size. Some of them are low, spreading shrubs, others are small, bushy trees, others have an upright habit, and many of them have a way of throwing out long wand-like branches at graceful angles, which gives them an exceedingly picturesque outline. The fruit of some of them, especially the varieties of the Asiatic *Pyrus baccata*, is beautiful and fragrant. There are several species like *P. spectabilis*, *P. Toringo*, and perhaps others which have been frequently crossed, so that it is hard to distinguish some of the plants botanically, but they are all beautiful objects at any season, and especially so when in flower. The so-called Japanese Crabs are particularly showy on account of the color of their buds, which are crimson, and the white or pink masses of their flowers are often beautifully varied by a few unopened buds near the ends of the branches. Our own native Crab, *P. coronaria*, is also extremely useful for its large fragrant flowers and its odorous fruit, and it has the advantage of flowering later than those of the other

so-called ornamental Apples. Altogether, wherever it is desirable to add to the general attractions of a park a special display of flowers in early May, no class of plants can produce such splendid effects as these flowering Apples.

DURING the last session of the legislature of New Jersey a bill was introduced for the establishment of a commission to investigate the forests of the state, to determine the best methods of forest management adapted to existing conditions, to arouse general interest throughout the state in various ways, and to prevent, so far as possible, the ravages of forest fires. All these objects are worthy ones, but fortunately investigations have already been undertaken under the direction of the Geological Survey, which look toward the accomplishment of the same ends. The forest interests of the state, therefore, will receive no injury because the Governor has failed to approve this bill. The State Geologist is qualified to superintend work of this sort, and everything which can be accomplished by this commission can be done by that officer. There is no doubt that the forests of New Jersey have a high value, but if the state makes any appropriation for protecting and developing this great natural resource, it can be used for the present to much greater advantage by the Geological Survey, which is already organized and active, than by the creation of another new board for this special duty.

The Source of Abietene.

ABIETENE is the volatile product from the resin of some west American Pines, and is the counterpart of turpentine which is distilled from the resin of some other Pines, chiefly those in the southern United States. Abietene is a more volatile liquid than turpentine, but both are hydrocarbons, although belonging to different series. About the year 1878 samples of abietene were received in Philadelphia with the statement in one case that it was the product of *Pinus Sabiniana*, and in another case that it was derived from *P. ponderosa*. Of recent years it has come to be understood that the commercial source of abietene is *P. Jeffreyi*. As I had in my possession the barks from *P. ponderosa* and *P. Sabiniana*, it occurred to me that something might be learned by examining the volatile product of these two samples. They were accordingly distilled, and, while the yield was small, it was enough to get the characteristic orange odor of abietene in both cases. In another experiment the amount of volatile oil in the bark of *P. ponderosa* was determined to be about 0.2 per cent. The bark, therefore, would not be a profitable source of the oil. It is probable that both *P. ponderosa* and *P. Sabiniana* have yielded samples of this oil, although it may be possible that *P. Jeffreyi* is at present the commercial source. Some years ago Professor Wentzell, of San Francisco, detected oil of turpentine in the resin of *P. ponderosa*. It is possible that both oils occur in different parts of the tree. Unfortunately, the commercial production of abietene and its resin is in the hands of a medicine company, which is disposed to attribute to these products curative virtues they do not possess. It is doubtful if abietene has any medicinal virtues superior to common oil of turpentine, or if the residual resin is superior to common rosin.

College of Pharmacy, Philadelphia.

Henry Trimble.

A river with its waterfalls and meadows, a lake, a hill, a cliff, a forest, ancient trees standing singly—it is objects like these which give beauty to a township and have a high use which dollars and cents never represent. They do more for education than hired teachers or preachers, and if the inhabitants of a town were wise they would cherish and preserve them. . . . I know a town in Massachusetts with a noble oak wood, to which, if preserved a century more, men would make pilgrimages from all parts of the country. As in many countries precious metals belong to the Crown, so here more precious objects of rarer beauty, like groves and river banks and mountain peaks, should belong to the public.—*Thoreau*.

Quercus lobata at Ukiah, California.

THE great White Oaks make the most delightful features of our valley landscapes. A few years ago, Ukiah Valley, viewed from the foot-hills, appeared to be covered entirely with one vast Oak forest. Throughout our rich bottom-lands immense spreading trees could be seen on every hand, now thickly dotting the grain-fields, now in extensive groves, and every valley view had a background of great white trunks and domes of foliage. The trees followed the smaller streams up into the foot-hills, they luxuriated in the deep rich coves about the base of the mountains, and even on the mountain slopes they grew wherever they could find the deep rich soil which seems essential to their happiness. Higher up the flanks of the mountain they soon gave place to the Black Oak, *Quercus Californica*, and the Post Oak, *Q. Douglasii*, which continued over the drier lands and over the mountains. But it was in the deep rich deposits of black gravel on the main valley floor that they grew most thickly and attained their greatest size. Year after year their numbers have been thinned slowly when grain or hay was the usual crop, but more swiftly since large orchards have been planted, and fruit, Hops and Alfalfa have become staples. But, in spite of the great gaps made in their ranks after all these years of cutting, thousands of veteran specimens still live and many large fields remain really groves



Fig. 25.—*Quercus lobata* in the Ukiah Valley, California.

of magnificent Oaks, which stand as they stood when the first white man entered the valley.

On the east side of the valley there was a wide belt a mile across and five miles long, which was once one great forest, and portions of it still contain our noblest trees. Other valleys in California have laid claim to pre-eminence in the beauty of their groves, and there are magnificent trees scattered through all of our valleys, but I believe that, taking into account the splendid proportions of some individual Oaks, the average size of all, with their

general stateliness and dignity of form and expression, the Ukiah Valley Oaks are unrivaled. Our valley is surrounded by high mountains, and is thus sheltered from the winds, so that the trees are apt to be symmetrical. The large rainfall and rich soil have done the rest.

Perhaps the most striking feature of the White Oaks, aside from their size, is the gray moss hanging in long streamers from every small limb. In the winter, when the moss is green on the large limbs, the contrast of this color with the pendent masses of gray moss and the brown bark is very beautiful. The types of White Oak are innumerable, and every tree seems to have a distinct form. There are full-headed trees, the top breaking into a wilderness of small ascending branches, and as fully furnished as if they had been pinched and trained by a gardener. Again we note immense boles with sturdy ascending branches, each large enough for a tree, and ending in stiff short branchlets. Then there are noble trees which branch evenly outward in perfect balance with hardly a twig broken and towering to 120 and even 140 feet in the air. Perhaps the most beautiful of all is the so-called Weeping form, in which the tree branches regularly and spreads widely, while numberless branches are thrown straight down. Some of these pendent branches are thirty feet long and little larger than a man's arm.

In a field on the east side of the river I recently measured some trees which ranged from eighteen to twenty-two feet in circumference at five feet from the ground. In the same field of about sixty acres there stood at least fifty trees over fifteen feet in circumference. Many of them had a great spread of branches, and one I measured covered a circle 144 feet in diameter. This tree girthed nineteen feet six inches, and its height was about 120 feet. Still larger specimens were to be found in another grove near by which has hardly been touched by the axe. In it I found a perfectly developed specimen in full health and not disfigured by the loss of any limbs. The trunk girthed eighteen and three-quarter feet at five feet from the ground, and it was more than 120 feet high (see fig. 25, page 202). The largest Oak that I have yet measured is growing here. The trunk has a small hollow on one side (see fig. 26, page 205), but otherwise it is sound. At five feet up it measures twenty-three feet nine inches in circumference, and at one foot above the ground 132 feet.

Ukiah, Calif.

Carl Purdy.

Foreign Correspondence.

London Letter.

RICHARDIAS.—The new yellow-spathed species, *Pentlandii* and *Elliotiana*, have lately been conspicuous in good collections and at exhibitions. Nurserymen are fully alive to the value of these two plants and are working up large stocks of them as rapidly as possible. They ripen seeds freely and they are also prolific in the development of supplementary buds on the tubers, which are a ready means of multiplication. I lately saw about a thousand healthy young plants of *R. Pentlandii* in a nursery in the south, and in one of our London nurseries I was asked three guineas for a plant of this species in flower. The spathes vary in size according to the strength of the plant and the cultivation. I have seen this year spathes of both species as large as the largest *R. Africana* (*Æthiopica*) and of the richest yolk-of-egg yellow. The two differ in that the leaves of *R. Elliotiana* are spotted with white and the spathe is uniformly yellow, while in *R. Pentlandii* the leaves are unspotted and the spathe has a large blotch of black-purple at the base inside. We have now, however, plants which combine the spotted leaf with the purple-blotched spathe; possibly these are hybrids between the two. There are also forms of *R. Pentlandii* with spathes of a sulphur-yellow color. The hybridist also has been at work on these plants, crosses between them and *R. Africana* having been successfully made. In my opinion these yellow *Richardias* are the most valuable additions that have been made to green-

house plants in the last twenty years. The time will come, and shortly, too, when the flowers will be offered by the dozen by the market-growers, and they will be as conspicuous in floral decorations as the White Lily of the Nile is now. Cultivators should bear in mind the fact that both *R. Elliotiana* and *R. Pentlandii* are warm-house plants.

HYBRID RHODODENDRONS.—The most beautiful *Rhododendrons* in flower at Kew at the present time are first hybrids—that is, crosses between two distinct species—and probably the handsomest ever raised is one called *Kewense*. This is the offspring of *R. Aucklandii* and *R. Hookeri*, both tender Himalayan species, and yet the progeny is as hardy as *R. Catawbiense*; at any rate, it is perfectly hardy at Kew. Even when not in flower it is a handsome evergreen, but when laden with its large loose trusses of big bell-shaped blush-white fragrant flowers it is a magnificent picture. It was raised at Kew and flowered for the first time about ten years ago. Grown in a cold greenhouse it is equally meritorious. The hybrids between *R. Fortunei* and *R. Thomsoni* are also flowering beautifully now. These were raised by Mr. Luscombe about twenty years ago, and he presented a set of them to Kew before they flowered. They have since been named *R. Luscombei*, Mrs. T. Dyer and Frances T. Dyer. Mr. George Paul, of Cheshunt, has raised a number of hybrids between *R. Fortunei* and some of the popular varieties of the *Catawbiense* type. These hybrids are also flowering at Kew, and in distinctness and beauty they prove to be of quite exceptional merit. Much has been done with the *Rhododendron*, but a great deal more remains to be done before we have got to the limit of the capabilities of this great and varied genus. A new and beautiful hardy species from China is now flowering for the first time at Kew, and we have seeds sown of several very remarkable species recently discovered in New Guinea. The potentialities of the *Rhododendron* as a garden plant are seen in the place it fills among hardy shrubs, among greenhouse plants and among perpetual-flowering shrubs for the warm house. These last we owe to Messrs. Veitch's operations upon the Malayan species.

PALMS.—If a census could be taken of the plants grown by nurserymen for indoor decoration it would probably show that Palms are first, and the rest nowhere. This is a very radical change from the state of things a generation back, when Palms, with the exception of *Livistona Chinensis* (*Latania Borbonica*), were grown only by admirers of the curious and rare. At that time the *Kentias*, from Lord Howe's Island, were rarities, and *Cocos Weddelliana* was as expensive as *Phalænopsis*. Now, millions of young plants of these two genera alone are raised almost every year from seeds. "Good Palms will sell when nothing else will," say the nurserymen. This preference for Palms is deplorable in one sense; it is driving many interesting plants out of cultivation. The nurseryman will not grow the collection plants which formerly were in favor; on the contrary, he is glad to get rid of them, often burning them by the houseful to make room for Palms. Surely we may yet hope that a taste for interesting and choice indoor plants similar to that which stimulates the collector and cultivator of Orchids, alpine plants and hardy trees and shrubs will not be allowed to die out entirely. Indoor gardening needs reforming and bringing into harmony with the best style of outdoor gardening. This can be done by discarding, as far as possible, the flower-pot and plant-stage and making the houses look less artificial than they are now. I am certain that the present style of greenhouse gardening is responsible for the lack of interest in it which is so evident in the horticulture of to-day. Two of the best proofs of this are in the preference visitors to Kew have for the temperate house, where the plants are all grown naturally in beds, and in the popularity of two show-houses in the nursery of Messrs. Veitch & Sons at Chelsea, one for Orchids and the other for greenhouse plants. In these there are no stages, the plants standing in natural groups in artistically arranged cork, rockwork and cushions of *Selaginella*, etc.

NEW PLANTS.—The following have recently received certificates: *Rhododendron superbissimum*; a hybrid between *R. Veitchii* and possibly *R. Edgeworthii*. These are the parents of *R. Forsterianum*, one of the best of greenhouse *Rhododendrons*, but Messrs. Veitch's new hybrid differs from this in the form of its leaves and in the size of the flowers, which are broadly campanulate, wavy and nearly six inches across. *Lomaria ciliata grandis*; a form with very wide pinnæ, approaching in this respect *Blechnum Brasiliense*. It was shown by the raiser, Mr. May, of Tottenham. *Lithospermum tinctorium*; a pretty alpine with the habit of the common Bugloss, but smaller in all its parts. The flowers are in terminal clusters and are of a deep blue color. It is a native of Arabia and Egypt. According to botanists, its correct name is *Arnebia tinctoria*. It was exhibited by Mr. Bennett Poë, of Cheshunt. *Primula Trailli*; an Indian species very closely allied to *P. involucrata* (Munroi), differing only in having larger leaves and flowers. The former are elliptic, about four inches long, green, with long petioles, and the flowers are in loose clusters of about six on long slender scapes; they are nearly an inch across, milk-white and fragrant. Shown by Mr. G. F. Wilson, Weybridge. *Narcissus Naiad*; a hybrid between *N. Empress* and *N. triandrus*, and one of the best of the hybrids raised by Mr. Engleheart. It has large white segments and a large wide-spreading straw-colored trumpet, and is a most distinct plant in every way. It was awarded the prize for the best new seedling *Narcissus* of the year. *Odontoglossum crispum heliotropium*; a first-class certificate was awarded to a plant shown under this name by Mr. R. B. White, Arddarrock. The flowers are large, white, tinted with rose, and heavily blotched with red-brown spots. It is one of the most beautiful of the many forms of this Orchid now known.

London.

W. Watson.

Plant Notes.

Pyrus Japonica.

THE Japanese Quince, *Pyrus Japonica*, also known in catalogues under the name of *Cydonia Japonica*, when well grown is one of the most satisfactory of the early-flowering shrubs which have been brought to our gardens from those of Japan or China. Among the points which recommend it to popular favor are its hardiness, quick growth, early flowering, its bright, clear-colored blossoms and its clean and not often diseased foliage. To these qualities might be added its ready adaptability as a good hedge plant, and the fact that some use may be made of its bright greenish-yellow fruit in the autumn.

Although accounted a hardy shrub and one which will bear a temperature passing to some degrees below zero of Fahrenheit, it will be sometimes injured in winter if grown in too cold and too poorly drained soil. For this reason it should be planted in a warm, well-drained soil, such as a sloping bank. Here the wood and buds are most likely to be thoroughly matured in the autumn before frosts occur.

The original type of this Japanese Quince appears to be the single deep scarlet-flowered plant which represents the species in most gardens where it is grown. A white-flowering variety is now frequently seen in gardens, although it cannot be called common. This white-flowering variety is found in catalogues under the names of *simplex alba* and *nivalis*, although a third one is offered under the name of *Pyrus Japonica candida*. The first two are much alike or identical, the third has rather broader, larger leaves and larger flowers with large rounded petals. One of the prettiest of the varieties is intermediate in color, between the red type and its white variety. This appears to pass under two or more names, *Moerlosi* and *Rosea* being most common. The buds of this are light rose-colored or pink; when the flowers open they are white and rose-colored, often curiously blotched, and as the blossoms grow old they often change to a deep dull red before the petals fall. The plant sold under the name of *Versicolor* has very simi-

lar characteristics, but varies enough to show that it had a separate origin. The variety known in some collections as *Grandiflora* has flowers larger than normal, at first pale or whitish, tinged with rose color, the rose color gradually diffusing through the petals and changing them from white to red as the blossoms grow old. The form *Aurantiaca* has what are called orange-scarlet flowers, a variation such as may be found among a number of seedlings.

A variegated-leaved form, called *Tricolor*, is interesting to those who care for the abnormal in nature. There are several so-called double-flowering variations, but the "doubling" is not far advanced, and a few only of the stamens have been changed into petals in addition to the normal number of five found in the flower.

Pyrus Maulei, or *Cydonia Maulei*, a comparatively recent introduction into our gardens, is considered a distinct species by some botanists, and by others merely a distinct variety of the Japanese Quince. It is a smaller and dwarfer shrub than the better-known Japanese Quince, and has smaller leaves, flowers and fruit. The flowers, however, are of a very bright rich red color, and the plant is really a great addition to our list of hardy shrubs. The fruit is bright yellow when ripe and strongly fragrant.

The fruit of the Japan Quince varies greatly in size and appearance on different forms, and it is generally regarded as worthless. With care, however, and in combination with some other fruits, it may be converted into a very agreeably flavored jelly, so that the plant may be made to furnish good material for culinary purposes as well as being ornamental. It makes a most satisfactory hedge in many situations.

For all ordinary purposes, as for hedges, where the red-flowered type is desired, it is sufficient to grow from seed, but any of the so-called varieties or any improved variation from seed should be grown from layers or cuttings. Grafting is often practiced, but shoots from scion and stock too often grow up together and become intermixed in the bush, the stock usually being the stronger and supplanting the scion.

Arnold Arboretum.

J. G. Jack.

Erythronium giganteum and *E. Hendersonii*.

THE best-known Pacific coast Dog's-tooth Violet is *Erythronium giganteum*, although it has been distributed under the incorrect name of *E. grandiflorum*. All of the bulbs of *E. grandiflorum* offered to the public for many years past by American seedsmen were really *E. giganteum*. This is the tallest and most floriferous of all Dog's-tooth Violets. While under ordinary conditions from one to five flowers are usual, it will, under favorable conditions, produce from eight to as many as sixteen straw-colored revolute flowers of large size, no larger, however, than are produced by other Pacific coast species. It grows on the coast ranges on the Pacific slope from San Francisco Bay to southern Oregon. It is not found in the heavily timbered belt which runs parallel with the coast line, but from that section to the great valleys toward the east it is common. On northerly slopes in timber in a loose soil it is at its best, especially where mold has gathered in rocky ledges. Few more beautiful floral displays can be found than the large beds of these in their full bloom. In places they are so thick that their leaves cover the ground and the slopes are yellow with their flowers. In the garden they come on after *E. Hartwegii*, *E. Hendersonii* and most of the *E. grandiflorum* varieties are gone. Plants of the *E. revolutum* type follow them in flower and outlast them, and, in fact, form seed-capsules before *E. montanum* shows in flower.

Erythronium Hendersonii is a beautiful species from southern Oregon, which, although differing a little in form from *E. giganteum*, has a similar leaf and revolute flower. Its color is a fine shade of pink-purple, with the centre a very deep purple to almost black. It is altogether a charming flower and comes third in the season's succession.

Ukiah, Calif.

Carl Purdy.

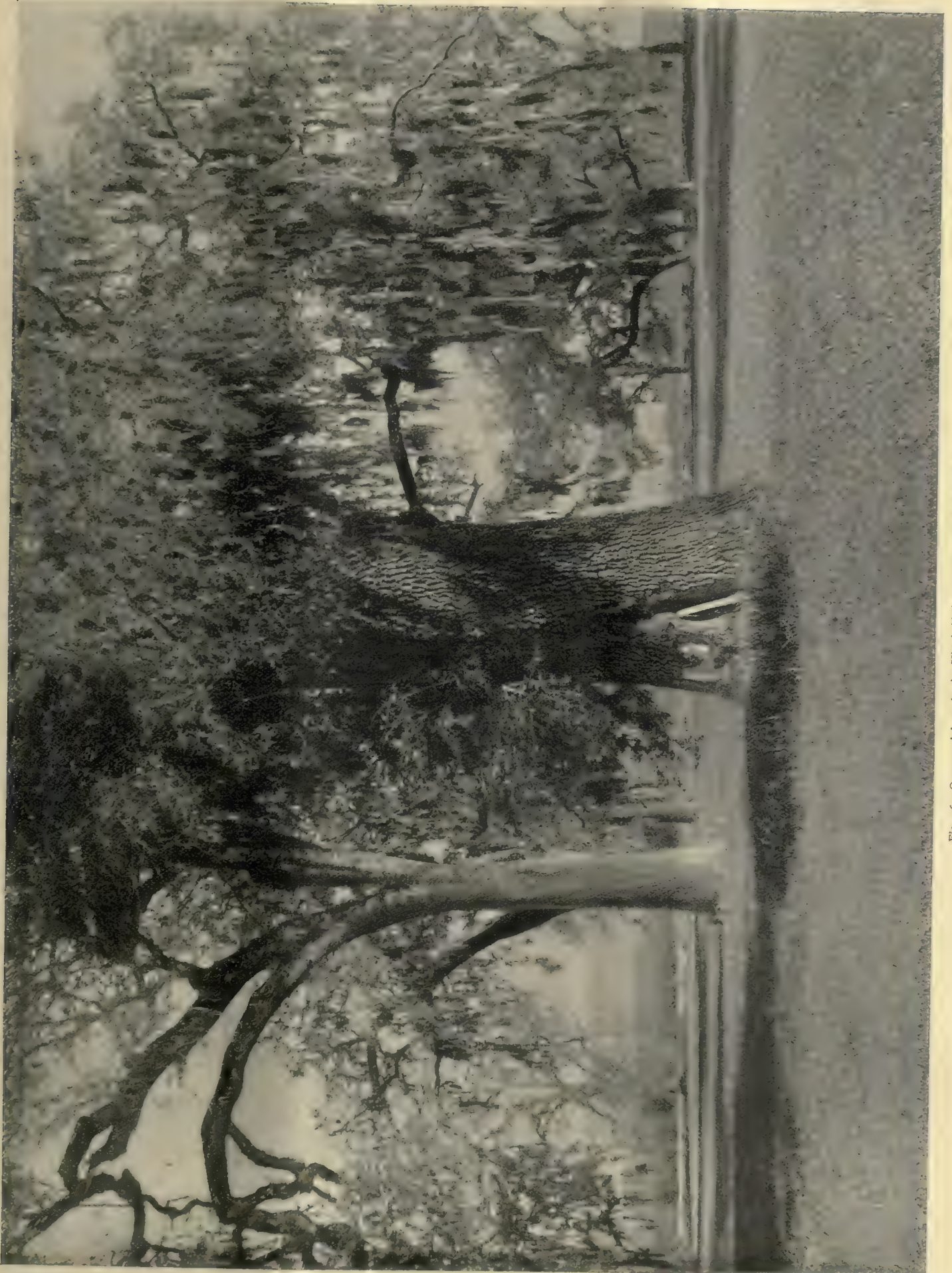


Fig. 26.—*Quercus lobata* in the Ukiah Valley, California.—See page 202.

Cultural Department.

The Vegetable Garden.

COPIOUS rains during the middle of May and the absence of unseasonable warm weather and of frosty nights have been specially favorable for starting vegetables of nearly all kinds. Peas especially revel in such weather and have made stout haulm which ought to yield good returns later. Our hot, dry summers make it impossible to produce as large, sweet, luscious peas here as in Great Britain, where the cooler, moister climate is extremely favorable to their growth, and their bearing season is much longer. With a little extra attention, however, a satisfactory crop may be grown. Hot weather forces the vines unnaturally, and if the roots are dry one good picking of peas is about all the vines will yield, when the ground might as well be cleared for another crop. A mulching between the rows with Meadow Grass or similar material is useful. If the Peas are sown where they can be watered artificially, and a good standing sprinkler is kept running night and day in the patch, the yield will be increased immensely. For a late crop we still find the old Champion of England indispensable. There are many varieties which produce larger pods and peas and as heavy crops in England, but they are not so satisfactory here for some reason. Stratagem, Yorkshire Hero, Shropshire Hero and Duke of Albany do fairly well; other kinds are unsatisfactory.

Lima Beans should be sown here about the end of May when the weather is settled and warm. If they are sown earlier they do not germinate satisfactorily. We find Burpee's Bush Lima the best of its class and have discarded the Pole Limas entirely. There is really no use for them when the bush varieties will yield fully as fine pods and many more of them in proportion to the space occupied, without the labor of erecting poles and keeping the vines fastened to them in the earlier stages of their growth, and the probability of their being blown down by autumnal gales. We make fortnightly sowings of String Beans until early in August, so as to have a constant supply.

Peppers and Eggplants do best in very rich soil. If a regular supply of liquid-manure and a light mulching can be afforded to the Eggplants the fruit will be greatly improved in quality as well as in quantity. Potato bugs are likely to be troublesome during the early stages of growth, and the plants will need hand-picking daily. Neglect in this particular may mean the loss of every plant in an incredibly short space of time. To destroy the same pests on Potatoes we mix one pound of Paris green with two bushels of air-slacked lime, and dust this over the plants with a fine sifter in the early morning while the foliage is damp. Two applications during a season are sufficient to keep them under.

Tomatoes have recently been planted out. These we will look over once a week to tie up and do necessary thinning out of laterals. Tomatoes are now generally trained on poles or to trellises, and those who have once tried this system will hardly care to see their plants rambling over the ground as in former years. For the best success Tomatoes should be planted on different ground at least every second year. The trellises are easily moved if they are light. Aristocrat and Autocrat are two useful dwarf-growing Tomatoes of the Champion type specially adapted for gardens where space is limited. We have tried both for forcing, but they were not a success. Generally we pick our first fruit out-of-doors about the end of June, from plants set out from six-inch pots with fruit already set. Our indoor plants provide a good supply until the middle of July, when we throw them away. A batch which commenced to fruit at the end of February is still bearing freely, and the fruit of a later lot is just beginning to ripen. As our plants are all grown in pots frequent waterings and copious doses of strong stimulants are needed at this season. Of varieties we have forced this season Cornet is satisfactory; the fruit is of medium size, firm and of good flavor, and it sets very freely in winter. Eclipse has done extremely well. We picked an average of sixty-two fruits from twenty plants in one batch. The fruit is not quite so firm as that of Cornet, and if planted out a large proportion is liable to come hollow. May's Favorite and Comrade are both desirable sorts to fruit from January onward. Some of our most popular outdoor sorts are failures under glass. At a commercial place near-by a grower who had not handled Tomatoes before planted a house 20 by 20 feet with Acme, Lorillard and Perfection in December. A house of this size planted with the proper forcing varieties and treated properly should have yielded 4,000 pounds of fruit, whereas not a bushel has been picked thus far, while the house is a wilderness of laterals almost as dense as an African jungle.

Many growers now transplant their Onions instead of sowing them outdoors, and this is certainly the best method. Plants set out about April 15th are now growing vigorously, and all the attention they will need from now onward is to stir the soil with a hoe or cultivator, and a good watering in dry weather, to make a crop of extra-large bulbs. Doses of liquid manure, applied once in ten days after the middle of June, particularly after a rainfall, will greatly increase their size. Onions are among the few crops which succeed on the same ground year after year. If Leeks have not yet been sown there is still time to make a sowing. To produce good Leeks they should be liberally treated during the growing season, like Celery. Musselburgh and The Lyon are first-class sorts. Early Parsley kept in frames over winter is now running to seed. This is a suitable time to make a sowing of Parsley for plants to be lifted in the fall and set in frames or placed in a cool greenhouse. When large enough to handle, the plants should be thinned out a foot apart. A variety of sweet herbs and pot herbs are needed on most private establishments. Some of these are annuals, while many are perennials. A sowing of any of these may now be made. Sowings of Cauliflower made now will give a good supply of heads in the fall. Brussels Sprouts, one of the finest of the Brassica family, may still be sown, while Savoys, Curled Borecole of different sorts, and Cabbage should not be neglected. Lettuce should now have as cool and moist a location as possible, and a fortnightly sowing will assure a constant supply. Good summer kinds we have tried are Deacon, Black-seeded Tennis-ball, Salamander, Big Boston and Sutton's Cabbage.

Early Celery has recently been planted outdoors in well-enriched trenches, and will be kept moist at the root to insure its steady growth. Our main sowing for winter use is not quite large enough to prick out yet. An additional sowing of Paris Golden should be made now to come in during October and November; if this is sown now there is less danger of its rusting. Cucumbers in frames and houses, particularly those of the English type, now require an abundance of water and frequent doses of manure, while a syringing with tobacco-water or some other liquid insecticide will keep black fly in check. Unless fumigation is done lightly and carefully it is liable to scorch the foliage badly. Squash bugs will shortly be about in swarms, and they will speedily destroy all vestiges of Squash, Cucumber and Melon plants if they are not attended to promptly. Some of these details are liable to be neglected during the rush of bedding out in the flower garden. We dust our plants with tobacco-dust and lime, particularly on the under sides of the leaves while the foliage is damp. A daily journey should be made among the plants so that proper care may be given them, and a few hours of neglect may cause serious loss.

Taunton, Mass.

W. N. Craig.

Notes on Garden Irises.

BEFORE the Irises mentioned on page 188 have ceased to flower the bolder-bearded species and varieties will make their appearance. As usual, the first to bloom is the purple-flowered *I. Germanica*, which is the most universally known species of the family. In fact, non-gardening people if interrogated will always say that "an Iris is a big purple flower often seen in old gardens." Following the type closely is the white variety and also the white Florentine Iris. Both of these Irises are slightly tinged with light purple, but are strikingly beautiful, having also bold flowers on tall stems and broad erect leaves. Both of these species are scentless. The flower which often does duty as *I. Florentina*, and is fragrant, is a form of *I. pallida*. There is a pure white form of *I. Florentina* known as *I. albicans*. Good forms of this are treasures not often to be had from the dealers.

Lately there has been introduced a superior form of *Iris Germanica*, variously known as *Macrantha* or *Amazon*. It bears a flower much larger than the type, but similar in coloring. The hybrid German Irises are also coming into flower. Of these I have several times in GARDEN AND FOREST given details which it seems unnecessary to repeat, but it may be said again that a carefully selected lot of these plants will give at this season in the garden of hardy plants a most charming and delightful effect with a minimum of trouble and expense.

Of a distinct type are the Siberian Irises, which are also of this season. These are beardless Irises with tall grass-like leaves, and as they have short creeping underground rhizomes they make dense clumps of the utmost hardness, and are very useful and effective in the garden. There are several forms with purple and white flowers which are of moderate size. There is also another narrow-leaved Iris, very common through Asia, *I. ensata*. The tall leaves are strongly veined, and the

flowers, which have narrow petals, light lilac in color, are borne on short stems among the leaves. I rather enjoy this species, despite its tendency to weediness, but as no one else seems to fancy it, it is, perhaps, better not to recommend it.

It is very difficult, perhaps impossible, to convey to the reader correct impressions of the colors of Irises as so many of them are purple. As this is a compound color, ranging from the reds to the blues, it has innumerable hues which one can only hint at as they appear in the various flowers. Not all of these hues are pleasing to me, and perhaps others might not fancy forms which might be commended, but I have no hesitation in noting the beauty of *I. Kochii*, which is of a most intense purple color of a reddish tint. This bears large flowers, and is among the most desirable of garden Irises.

None of these Irises offer the slightest difficulty in cultivation in ordinary garden borders, the intention of these notes being to indicate only the useful, easily grown and effective kinds. This note, it will be observed, mentions two types of Irises, those with thick rhizomes which creep at or near the surface, and those with thin underground rhizomes—*I. Sibirica* and *I. ensata*. The latter may be planted, like any herbaceous plants, with the crowns at the surface. The others should be planted with the thick rhizomes only half-buried. These may be planted at any time when the ground is warm, but I prefer, if possible, to move them just after flowering, as they soon thereafter make a new growth, and by autumn are strongly established and will be effective the next spring, which they seldom will be if planted in the fall. The exception to this would be when plants are only moved a short distance and are not checked. In such cases it really is of little importance if planting is deferred to that time. Ordinarily, however, one receives the plants from a distance, and they have become dormant. In such cases, if received in the late year, I prefer to winter them in frames.

Iris notes for the middle of May would not be complete without calling attention to some other species which are by no means to be considered as reliable garden plants. At this time commence to flower those curious Asiatic Irises which, being natives of countries with rainless summers, require special and careful culture. They are to be classed among those which the gardener considers "interesting" plants, by which is usually understood those which give more trouble than flowers. *Regelia* and *Oncocyclis* Irises are, however, amenable to rational treatment, which will vary somewhat according to latitude of the garden. Here where we have very severe weather sometimes and only occasional snow for protection, it is necessary to retard the growth of the foliage till early spring, say April. By planting the roots, about four inches deep, at the end of November, the leaves appear above ground after hard frosts have ended. They are planted out in fully exposed borders and care is taken that they are well supplied with water while growing. Soon after flowering the old leaves show signs of maturing. At this time it will be found that new buds are well formed. The plants are then lifted, planted out in Lily-pans and kept perfectly dry and warm during the summer. Care must be taken in the fall to keep them cool, to prevent their starting prematurely. Under such treatment fair success is had here. All the species are quaint and odd in form and coloring. For instance, *I. Suwarowi* has standards lined with blue and edged with golden-brown; the styles are also brown, the crest a bright blue and the falls also lined with blue and with a dark blue signal. *I. Korolkowi* concolor is of a pure heliotrope hue. *I. Lupina* has a curious combination of yellowish green with black dots and linings. *I. nigricans*, a new species, is somewhat in the way of *I. lupina* in coloring, varying in hue and in forms of petals. Professor Forster and others have hybridized many of these Irises and the hybrids are as quaint as the parents. One of these, *I. parkor* (*paradoxa* × *Korolkowi*), blooms very freely here and has richly colored dark purple flowers, the hairy signals being a rich plum-purple color.

Elizabeth, N. J.

J. N. Gerard.

Flower Notes.

FLOWERING plants of *Primula Japonica* in crimson and white have been the prettiest things for table decoration we have had this spring. They were raised from seed last spring and grown in six-inch pots. When autumn came they ripened crowns and were kept with a limited supply of water in a cool pit until spring, where they have been brought into bloom without heat. In sheltered spots these Primroses are hardy. The broad handsome foliage resembles that of the common Primrose and has a distinctly rosette-like arrangement. The flowers are borne in successive whorls on lofty scapes, sometimes over two feet in height. It is a giant among Primroses.

Compared with this, *Primula cortusoides* is a gem. Its small, rounded, slightly hairy, sinuate leaves hug the ground, and from this mat of leaves arise slender scapes of lovely umbellate rose-colored flowers. There are several named varieties, but so far the type has proved the hardiest. It has rhizomatous roots, which creep over or very near the surface, and on this account the plants need slight protection in winter. A few forced plants of the double white English Primrose bloomed nicely in the cool greenhouse during the late winter months. They make two or three new crowns during the winter. After the blooming season we divide them to single crowns and plant them out in a shady corner. Care should be taken that the long fleshy roots go as deeply into the soil as their length allows, or they will suffer during dry weather.

The double *Lychnis Flos-cuculi*, Ragged Robin, has proved a most useful winter bloomer. The attractive, semidouble pink flowers are borne abundantly all winter; in fact, it is scarcely ever out of bloom. It is quite hardy with us, and increases freely, as any bit of stem will root. In this way it would be possible to get up a large stock of it in a short time.

The rock garden and its surroundings in the grounds belonging to Professor Sargent, of Brookline, Massachusetts, are very attractive just now. The adjacent shrubbery, wooded and grassy slopes are covered with an undergrowth of *Narcissus Poeticus*, Squills and wild Tulips. Large numbers of bulbs have been used in an effective, yet most natural way. On the rock garden conspicuous are large patches of *Daphne Cneorum*, which, owing to the mildness of the past winter, is looking fine everywhere. *Orobis vernus*, the spring Vetch, with rosy Pea-like flowers, changing to purple, is evidently well suited as to location. We have found it hard to establish, though succeeding well enough with other species. The white and blue Grape Hyacinths are remarkably neat. *Trollius Europæus*, with large incurved Buttercup-like flowers, is interesting at all times. It has a long season of bloom, ripens seed freely, which germinates slowly. Seed sown last spring did not come up until this, while the bulk of a lot sown last autumn is up at the same time, but not all, and probably if we hold over the seed-box until next spring there will be another installment to come up. It is the same with many species of *Clematis*, *Hellebores* and other members of the *Ranunculus* family to which the *Trollius* belongs. *Fritillaria gracilis* resembles our common *F. meleagris*, odd, if not beautiful. *Stellaria Holostea* is pretty when in bloom, large sheets of white star-shaped flowers, a rapid grower and a good carpet plant for shady places. If obtrusive it can easily be disposed of, and so does not become a nuisance in the way *Anemone Pennsylvanica* does. The double Vernal *Anemone* remains in bloom when the single form is long past. *Ajuga reptans*, with spikes of blue, is not as showy as its deeper-tinted relative from the Alps of Europe, *A. alpina*, but is a better carpet plant, and capital for covering bare spots in shady places near water. *Alyssum saxatile* in the sun are sheets of yellow. *Iberis sempervirens* is a mass of white cruciform flowers. Vernal Snowflakes remind one of the cottage gardens of England. *Primula cortusoides* is even better this year than last, is well established and blooming profusely. Its rose-colored flowers are as nearly perfect in tint as one could imagine.

Wellesley, Mass.

T. D. Hatfield.

Notes from the Rock Garden.

NO part of the garden is so interesting at this season as the rock garden. Last winter was favorable for hardy plants, and with abundant rains recently and warm weather now no nook or crevice is without blossoms to delight the lover of early-flowering hardy herbaceous or alpine plants. Perhaps none of these plants has greater interest than *Dryas octopetala*, especially to me, for during the past six or seven years I have several times raised plants from seed, but have never been able to have them live long enough to come into flower. At last, however, I have been successful, and now there is a beautiful patch of this lovely, modest plant well covered with flowers. The plants were raised from seed some two years ago and were grown in pots until the beginning of last September. They were then transferred to the rock garden where they grew during autumn. They came through the winter in perfect condition. They are in a slightly elevated position in rather deep light soil, where I expect they will grow and spread rapidly. The name was taken from the wood nymphs to whom the Oak was sacred and applied to the plant because the young leaves of *D. octopetala*, on which the genus was founded by Linnæus, resemble small Oak leaves. The plant is low, shrubby and evergreen, with simple, obovate or subcordate, crenately serrated leaves, white and downy beneath. The

flowers are white, slightly more than an inch in diameter and with many yellow stamens in the centre. In fact, the flowers resemble small, white, single, upright roses. They are produced singly on upright peduncles four or five inches long. It is a native of the cold regions of the northern hemisphere.

Another interesting plant from eastern Russia, which has taken good hold among the stones and rocks, is *Dracocephalum nutans*. This makes a good rock plant. It self-sows its seeds in the crevices, where they grow up and blossom in the spring. It is six or eight inches high when in flower. The whorls of blue labiate flowers are disposed in long nodding racemes, and the stems are clothed with petiolate, ovate, crenated leaves.

Skirting the edges of some large stones, where the soil is cool and moist, *Lathyrus palustris* is growing well and blossoming freely. In such a position this is a pleasing plant. It is about one foot in height, and the peduncles have four or five variegated blue and purple flowers. *Globularia trichosantha* is a mass of blue flowers. It is a choice rock-garden plant and flourishes in an open position in deep light soil. It is exceptionally hardy and withstands the most severe winters. It is six or eight inches high. The light blue flower-heads are pleasing and distinct and are produced plentifully for a long time. *Globularia vulgaris* is also in blossom; the two species are similar, but *G. vulgaris* does not grow as tall as *G. trichosantha*.

The pale blue flowers of *Phlox stellaria*, which are a different color from all the flowers about them, make this plant very desirable. For masses of yellow there are no better plants in blossom now than *Alyssum saxatile* and *A. gemmense*, *Erysimum pulchellum*, *Viola lutea grandiflora* and *Papaver nudicaule*. For the best effect these plants must be grown in large masses where they can be seen from a distance. The best white-flowered plants now in blossom in masses are different species of hardy Candytuft, *Iberis*; a half a dozen species of Rock-cress, *Arabis*, and the *Drabas*, *D. alpina*, *D. frigida*, *D. Altaica* and *D. Johannis*.

Phlox reptans mantles the soil among the rocks with its creeping stems and soft green leaves, and now it has thrown up numerous flower-stems six or eight inches high, terminated with deep rose-colored flowers. *P. procumbens* is more dwarf, with flowers of the same color. Both of these showy *Phloxes* are indispensable in the rock garden. *Veronica gentioides* is the earliest *Speedwell* to bloom. A desirable form here is showing larger flowers and longer flower stems than the type; the flower-stems are about a foot in length, and the light lavender flowers are in long loose racemes. The dwarf, trailing *V. pectinata* has pretty small downy leaves and numerous small blue flowers. It is suitable for dry elevated situations.

Vinca herbacea is useful and less common than the well-known *Periwinkle*. Its clinging stems among the rocks and the blue flowers nestling among the leaves are pleasing. It grows best in an open position and in slightly moist soil. The lower edges of the rock garden, where the soil is deep and cool, make a good home for large plants of *Dicentra spectabilis*, the most graceful plant now in bloom.

Scilla Hispanica is worthy of wider acquaintance. The bulbs are cheap and easily obtained in autumn, and if planted then they are sure to bloom the following spring. The blue flowers are in loose racemes eight or nine inches in length. There is a handsome white-flowered variety also in bloom now. This *Scilla* grows well in almost any soil and should be planted in a mass. In the shade of some trees a bed of *Primula auricula* has been flourishing for the last half-dozen years. These plants are quite hardy, and the beautiful flowers may be counted upon each year regularly. Large masses of *Lily-of-the-valley* fill the air with fragrance as their flowers are beginning to open. This is an excellent plant for shady places under trees, and otherwise unsightly spots may be made green and beautiful with it. The lovely *Aubrietias* are still blossoming. *Orobis vernus* has yet some flowers left, and *Omphalodes verna* is still in good condition. *Anemone sylvestris* is a handsome plant about one foot in height and has large white flowers. It is easily accommodated and grows freely in the rock garden in almost any position.

Harvard Botanic Garden, Cambridge, Mass.

Robert Cameron.

Summer Pruning the Raspberry.

REGARDING the pruning or pinching back of Raspberry canes in summer, as referred to by Professor Goff in your issue of May 5th, I may say that some experiments which I have carried on for three years corroborate the views set forth by Professor Goff, namely, that summer pruning is, at least in this climate, an injurious practice. The experiments were

begun in 1894. The results, as affecting yield, are shown by the following figures, which represent the number of boxes of berries gathered from each row. The length of the pruned and unpruned rows was the same, of course.

VARIETIES.	YIELD, PRUNED.		YIELD, UNPRUNED.	
	1895.	1896.	1895.	1896.
Heebner	90	10	96	19
Springfield	32	11	49	17
Royal Church	31	3	37	6
Carman	25	23	41	39
Thompson's Early Prolific	36	21	68	46
Herstine	32	11	49	21
Parnell	32	11	37	12
Golden Queen	40	6	59	17
Brandywine	43	..	64	..
Niagara	22	12	46	19
Marlboro	23	3	27	14
Hansell	31	10	47	18
Clark	20	8	37	10
Cuthbert	35	15	70	11
Turner	23	11	50	9
Caroline	47	16	64	32

The canes were pinched twice during the summer; the first time at eighteen inches, the second when the laterals had grown fifteen to eighteen inches in length. In this experiment the number of suckers did not appear to be greater in the pruned row than in the unpruned. I am of the opinion that in all sections where winter protection is necessary, Raspberries should be thinned rather than pinched.

Experimental Farm, Ottawa, Canada.

John Craig.

Correspondence.

Lilac on Privet Stock.

To the Editor of GARDEN AND FOREST:

Sir,—The past winter has proved the unsuitability of the Privet as a stock for Lilacs, when planted in severe climates. During December and the greater part of January of last winter the ground in this section was unprotected by its usual blanket of snow. The temperature ranged low, fluctuating between twenty degrees of frost and twenty-five degrees below zero, which latter point it touched on two or three occasions. On examining the collection of Lilacs in the arboretum and on the grounds this spring it was found that a large number of those on Privet stock were completely root-killed. The injury to the stock was severest at the collar, where the bark in most cases could be easily rubbed off with the fingers. The union between stock and scions was clearly defined by the limits of the injury upward. The injury downward extended almost to the tips of the roots in some cases, and in others to the depth of a foot only below the surface of the ground.

Lilacs should be propagated by layers; by root or top cuttings when intended for planting where severe cold may find the ground unprotected. It is possible that heavy mulching in the autumn might have saved some of the plants referred to above, but this work is laborious and not always satisfactory in its results.

Ottawa, Canada.

John Craig.

The Massing of Wild Flowers.

To the Editor of GARDEN AND FOREST:

Sir,—Superintendents of parks and owners of extensive private grounds have much influence in moulding public taste in horticultural matters. Learned works on floriculture or landscape-gardening are read by the few, but the gardener's work is an illustration that he who runs may read. Naturally enough, therefore, his mistakes are copied and his successes patterned after on every hand. It is a gratification to the true lover of our American flora to note that those in charge of extensive grounds are of late years adding more and more of our best native shrubs, climbers and herbs to their planting lists. These plantings, however, rarely show the breadth and plenitude of nature at her best. They show a narrowness of scope, a paucity of effect, as if the authors feared to follow nature in her lavish displays.

It is true that around our villages and through the long-settled portions of our country the flora is scattered thinly, with rarely any breadth or mass of any one species. The fact is, that something like extermination has been going on for many years. But away from the homes of man and the haunts of cattle the

scene is changed. Looking over the unbroken, unbrowsed prairies in June and July we see acres upon acres of bloom. Here one can find a hundred solid acres of Phlox, white, mauve, pink, carmine, crimson and red, and all this dashed with the brilliant red of ten thousand flowers of *Lilium Philadelphicum*. A tiny rivulet, rippling past banks fringed as far as the eye can reach with the mingled scarlet and indigo hues of our two brightest *Lobelias*; a sweep of lowland one solid sheet of azure-blue *Houstonias*, and a wooded hillside thickly dotted with thousands upon thousands of the golden bells of *Erythronium Americanum*; these are other examples of nature's floral wealth that might be multiplied indefinitely, and why could they not be imitated in our large parks, or on a smaller scale in our less spacious ones?

One tires of the artificiality of carpet-beds and formal parterres, and it is doubtful if these things ever gave a tired city toiler a longing for the country. But a bit of nature that tells of the wildwood and the river path is a standing invitation to turn from noisy streets to the country's peace and quietude. If the masses in our crowded cities cannot go to nature for enjoyment, why not bring real nature to them—and nature in one of her most inspiring moods?

Pineville, Mo.

Lora S. La Mance.

Protecting Roses in Winter.

To the Editor of GARDEN AND FOREST:

Sir,—In Wisconsin we must protect in winter, climbers, such as the *Prairie Queen* and all hybrid *Perpetual Roses*, or they die. In the rural districts this is made difficult by the field mice, which work into the litter, where bush or vine is laid down, or up into the windings of those left erect, and gnaw off the stems to make room for their nests. Many lay their choice *Roses* on the ground and cover with inverted sods and then with litter. This plan succeeds, but is a great task, and uncovering must be done early, or the plant is smothered. The risk of a late frost must be taken.

At my summer place in Lake Mills I have for four years tried the experiment of a rough board housing or "lean-to," otherwise tight, but wide open on the north side. A few dead leaves are scattered around the roots, but nothing more. Covers are kept on until after May 15th. The shoots start late, and are somewhat pale, of course, but never have suffered from the uncovering, and I have never lost wood or failed of a luxuriant bloom.

This plan beats the mice, retards spring starting, and does away with the hurry to uncover. Perhaps the idea is new. At any rate, it is not borrowed and is novel in that neighborhood.

Chicago, Ill.

David E. Bradley.

Sprouting Pines.

To the Editor of GARDEN AND FOREST:

Sir,—To the interesting notes on sprouting Pines, given in No. 482 of GARDEN AND FOREST by Mr. Pinchot, I can add the following:

(1) The sprouting of *Pinus echinata*, which Mr. Pinchot supposes to have been observed for the first time, is, as I have often had occasion to see, a common occurrence over its entire field of distribution. Dr. Mohr, in his monograph on the Timber Pines of the Southern States, on page 98 (*Bulletin No. 13 of Division of Forestry*), writes as follows about this capacity of the Long-leaf Pine:

"During this season (the second year) adventitious buds appear at the collar of the stem, which bring forth vigorous sprouts, particularly if the stem has sustained the slightest injury. They are apt to form strong branches before the tree has reached its fourth or fifth year. Such branches, which are produced profusely from the stumps of larger trees, scarcely survive another season."

(2) To the Pines which produce persistent sprouts one of the southern species is to be added. Mr. Roth, of the Division of Forestry, now traveling in the south, sends us a specimen of the root of a *Pinus serotina* sapling with the signs of at least two crops of sprouts and a number of living sprouts, the largest of which is at least four or five years old, with a length of nearly four feet and twenty millimeters diameter at the root-collar. Mr. Roth states that hundreds of cases of such sprouting can be observed on an acre, some of those seen being ten years and more old. Logs as well as scrubby trees, much like those of *Pinus rigida*, are clothed along the stem with short sprouts.

This Pine, by the way, known to the loggers as "Marsh Pine," forms a considerable proportion of the lumber cut along the seacoast of North Carolina, where, with *Pinus palustris*, it

covers extensive flats, or, with *P. Taeda*, goes into the marshes, often replacing *P. Taeda* and becoming the only occupant.

It develops nearly as well as the latter, averaging about one foot in height per year, and in six years making a diameter of thirty inches, with forty feet of log-length. It bleeds freely, and is bled for turpentine, as it seems all the southern Pines now are, with the exception of *Pinus glabra*.

While this capacity for sprouting is interesting physiologically, it can hardly be of economic value, except where, as in the Jersey plains, to keep a vegetable cover in spite of the recurring fires, may be of future benefit.

Washington, D. C.

B. E. Fernow.

Recent Publications.

Die Nadelhölzer des Cilicischen Taurus. By Walter Siehe. *Gartenflora*, March and April, 1897.

In these short papers an interesting and vivid account is given of the coniferous trees indigenous to the long mountain range on the south coast of Asia Minor. The northern slopes of the mountains have been entirely laid waste by the wanton destruction of the forests for the use of silver smelters, and the trees referred to occur on the southern slopes, and in many cases have been preserved owing to the inaccessibility of the regions where they are at home. The Turk is not the best forester in the world, and of forest management there is none at all. A piaster (five cents) will purchase a tree, and any wandering shepherd is liable, for an evening's entertainment, to set fire to a Cedar of Lebanon, which, if properly hewn and transported a three days' journey to the coast, would realize a small fortune.

Among the trees noted, the Lebanon Pine, *Pinus Brutia*, Ten., is the most widespread of the Cilician conifers, and forms vast forests at an altitude of from 400 to 1,500 meters. It is a magnificent tree, much resembling *P. Strobus*, L., in its habit. The forests are very dense, and many of the trees reach a height of thirty meters, of which twenty meters show an absolutely erect, branchless trunk. Higher in the range, from 1,500 meters up to the Cedar zone, the Black Pine, *P. Laricio*, Poir., var., is encountered in quantities; a fine tree, with smaller cones than those of the type. *Abies Cilicica*, Ant. & Ky., is abundant, and more famed for its stately beauty than for the usefulness of its wood. In the forest near Namrun it attains a height of more than thirty-five meters, with a diameter of three-fourths of a meter, and preserves its branches down to the ground. In some parts of the range it forms dense forests, to the exclusion of other species, and thrives up to an altitude of 2,000 meters. The highest forest region is the most interesting in the mountain chain, for there, in company of *Pinus Laricio* and *Abies Cilicica*, is found that most magnificent of all trees, the Cedar of Lebanon, *Cedrus Libani*. On the mountains from which it takes its name it is all but extinct; in the Taurus, however, it thrives in great luxuriance, and has been preserved owing to the remote and almost inaccessible crags where it thrives. It is rather widespread, and extends from the Lycian Mountains to the Euphrates, rarely descending below the 1,200 meter level. It grows in open forests, each tree standing alone in stately grandeur, the straight, slender trunks not rarely one meter in diameter and forty meters in height. The cedar-wood is very valuable and twice as costly as that of the Pines. It is yellowish, very close and deliciously fragrant. Its durability was appreciated even when the Temple was built at Jerusalem, and to-day, cut into the panels whereon "icons" are painted, it is in great demand in the Greek Church. *Taxus baccata*, L., is occasionally encountered, usually only solitary and scattered specimens, some of which attain the considerable diameter of half a meter. Curiously enough, the principal factor in their preservation has been the fear of a certain legendary and revengeful nymph, and it would be very difficult to give their age. The Oriental Cypress, *Cupressus sempervirens*, L., is rare in the range, and it is noted that the pyramidal form of the tree, so frequent in eastern cemeteries and elsewhere in ornamental planting, was only seen a few times in the wild state.

Notes.

The general catalogue of the Southern California Acclimatizing Association has once more come to this office from Santa Barbara. The list of plants is very interesting and valuable for planters in the southern states, and the hints for cultivation make the little pamphlet what it claims to be, a guide for gardening in the south.

Nymphæa alba and *N. Laydekeri* were in flower in this vicinity last week. These will be closely followed by *N. carnea*, *N. chromatella* and others which are now showing buds. The continued low temperature of the season has checked the tropical Lilies, though, perhaps, few have yet been planted out by prudent growers. With the exception of the Cape Pond-weed, *Aponogeton*, there do not seem to be any exotic aquatic plants which rival in earliness of flower our native Marsh Marigolds and Arums.

The last issue of the New York *Fruit Trade Journal* gives an account of a newly planted Grape-fruit grove in Florida, said to be the largest in the world. The soil is virgin hummock land which, within a year, was cleared of massive Oak and graceful Palmetto trees and comprises above two hundred acres. The tract extends half a mile along the Manatee River and is more than that distance in depth. The land was thoroughly prepared by experienced cultivators of Grape-fruit, and 20,000 budded trees of the best varieties have been planted.

California papers say that nearly two thousand acres of Canaigre will be in cultivation on the big plantations of the Anglo-American Canaigre Company, near Rialto, in San Bernardino County. This is a native plant of the Dock family, whose roots are rich in tannin, and it is expected that 8,000 acres will be planted at the beginning of the next year. The plant is indigenous to many parts of the state, and wild roots are gathered, planted in rows and cultivated like Sweet Potatoes. It is said that tanning with Canaigre can be done much more rapidly than with other material and requires only days where weeks and months are needed with barks.

The first consignment of winter apples from Australia reached San Francisco last week, and in this fruit Mr. Alexander Crow, the State Quarantine officer, discovered the small white larva of an unknown moth. This grub was tunneling in various irregular directions through the apples close to the skin, and the evidence of its industry was manifested on the outside by an irregular discoloration. Every apple was consigned to the steamer's fire-box, for, undoubtedly, if this Australian apple-miner had been landed it would have become a dangerous enemy to the fruit industry of the Pacific Coast, which has so far escaped from the ravages of the codling moth. This is not the first time that this vigilant quarantine officer has saved the fruit orchards and Orange groves of the west coast from devastation by a new pest.

Fothergilla Gardeni, a shrub of the Witch Hazel family, and the only species of the genus, which was in flower here a fortnight ago, is rarely seen in cultivation either in America or Europe, although it was introduced into English gardens from our southern Alleghanies 130 years ago. For some reason, perhaps because it is not easy to cultivate, it is not as abundant in England now as it once was, although it is very beautiful when in flower, and has an excellent habit, with abundant deep-colored foliage. It is a compact shrub when well grown, five feet high, with numerous stout stems, and in early spring, just before the leaves appear, it is covered with almost globular clusters of long white stamens, the only showy parts of the flower, which make it a conspicuous object. Although it is not found naturally north of North Carolina, it seems to be perfectly hardy in New England, and it flowers profusely in the Arnold Arboretum, although it does not ripen seed. It was figured in this journal, vol. viii., page 445.

The first car-load of California cherries arrived in this city May 10th, when the best grades of favorite varieties brought from \$4.30 to \$6.25 a box, wholesale, the highest prices ever paid here at auction for this fruit. Early Purple Guigne, considered the earliest good cherry, was the first arrival this year; it is of medium size, sweet and juicy. The dark varieties thus far have been of better quality than those of lighter color. Among the dark sorts seen here now are Early Black Guigne, known also as Baumann's May; Black Tartarian, the best of all the black cherries, and of the largest size when fully mature; Knight's Early Black, Guigne Marbrée, the old and well-known May Duke, of rich subacid flavor, and California

Advance, a seedling of Early Purple Guigne. Rockport Bigarreau, Belle d'Orleans and Governor Wood are among the light-colored cherries now in season. Thirty cents a pound is the average price of this fruit in the retail stores, but much of it doubtless remains unsold at this high rate, especially as only a small portion is fully grown and ripe. The first Florida peaches arrived on the 19th instant. The variety known as Honey Sweet has been most abundant, with a few crates of Bidwell. New-crop pineapples are also coming from Florida. Strawberries, from North and South Carolina, and from Maryland and Delaware, are in our markets, together with the first pickings from New Jersey.

Professor Card, of the Nebraska Experiment Station, has been making a study of wind-breaks and publishes a bulletin which embodies the experience of a large number of farmers and fruit growers, both in the east and in the west. A very considerable majority of the writers from all sections of the country believe in the value of wind-breaks, but widely different reasons for this faith are given. The western growers consider the protection against the hot winds of summer as the highest use of wind-breaks, while in the east the protection against windfalls is considered the most important by fruit growers. In the west, too, the saving by the prevention of windfalls is recognized, but of still greater importance is the protection against evaporation of moisture from the soil by winds, which is mentioned in letters from all sections. The western growers protect their land chiefly on the south and west, while the eastern growers need protection on the north and west. The observations at the station bear out in a striking way the opinion expressed by many growers that wind-breaks are of great value in reducing evaporation from the soil. The water contained in samples of soil showed a decreasing amount of moisture for a considerable distance under the lee of the breaks, and evaporation as measured directly by the evaporimeter accorded perfectly with the results obtained from the soil samples; and finally the measurement of certain plants themselves corroborated both the other tests and demonstrated fully the practical importance of this protection in preserving the moisture in the soil.

The Castor-oil plant has been cultivated since the earliest historic time, and specimens of it supposed to be over four thousand years old have been found in Egyptian tombs. It is perennial in India, its native country, but as it has spread into less congenial climates it has lost that habit, like the Cotton-plant, and is known to us as an annual. It is commonly supposed that the plant will grow wherever Indian Corn will thrive, and this is true where it is meant to be used as an ornament, but a recent circular published by the United States Department of Agriculture points out that it can only be grown effectively in commercial quantities in warm climates, since its only value is the oil content of the seed, and the general truth which is applicable to nearly all oil-bearing plants holds in regard to this one, namely, the warmer the climate the larger the per cent. of oil. Some varieties of the Castor Bean will mature seed in the northern half of the Indian Corn belt of the United States, but the plant cannot be cultivated there so as to yield paying quantities of oil. It needs a deep, fertile, loamy, friable and well-drained soil, and then where the climate is sufficiently warm it will yield from twenty to twenty-five bushels of beans to the acre, containing from fifty to sixty per cent. of oil. The seeds, after being soaked for twelve hours in tepid water, should be set five or six feet apart each way, two in a hill, and when three or four inches high the weaker plant should be removed. The weeds should be destroyed and the ground kept loose by surface stirring. The seed-spikes should be collected as soon as the pods turn brown and before the seeds drop out of the pods in handling, and placed in the sun until the seeds are partly free from the pods. Frequent gatherings are necessary, so that only such spikes are removed as are in proper condition. The seeds are first cleaned; then, after being gently warmed, are placed under a screw-press, which liberates a whitish liquid. This is mixed with water and boiled for some time, and the impurities are skimmed off as they rise. Clear oil is at length left on the top of the water, the mucilage and starch being dissolved and the albumen coagulated by heat forming a whitish layer between the oil and the water. The oil is further clarified by boiling, which drives off the acrid volatile matter. The Italians have a special method of preparing the oil which rids it of its nauseous flavor, and in this country medicinal oil is manufactured by cold expression from the crushed beans. The oil is largely used in soap manufacture and for machinery. It is the thickest and heaviest of the oils.

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Common Plants.

EVERY nurseryman's catalogue gives an important place to its list of rare plants, and, of course, the prices of trees and shrubs and herbs which are scarce are higher than those which afford an ample stock to draw upon. This is simply in obedience to the law of supply and demand, which in a general way regulates the prices of every commodity which man desires for use or ornament. In the eye of some persons, however, rare plants are invested with a value which does not belong to them intrinsically. One who has acquired the habit or passion for collecting, places the highest value on objects which are unique. A first edition or the only known copy of a book which in itself is nearly worthless may be a prize for which a book collector will give a small fortune; and in the same way an Orchid which is the only individual of its species known will command a price quite out of proportion to any charm it may have of form or color or fragrance. The case of one who is studying a given genus of plants is somewhat similar. He may want an Iris, for example, to complete his series, and to him the missing plant has an importance that would not belong to it under any other conditions.

All this is readily comprehensible, but there are other people who have a feeling somehow that rarity is in itself an element of beauty in a plant; at all events, if they would not state this broadly, they firmly believe in its converse, namely, that a plant which is common is not desirable. It is this idea which lies at the root of the distinction between "common trees" and "ornamental trees" which we so often hear. This notion was once so prevalent that it was a difficult thing a few years ago to find common American forest trees and shrubs for sale in American nurseries. When Central Park was planted it was easy enough to buy European Birches, Norway Maples and Horsechestnuts, but few nurseries had our own Canoe Birch or Pin Oak or Pepperidge. English Hawthorns could be had by the hundred, but many of our native Thorns were not propagated at all. Spiræas and Kerrias and Honeysuckles from abroad could be had by the thousand, but our native Honeysuckles and many of the best of the Viburnums and other American shrubs were not classed as ornamental plants

at all. Conditions have changed since then somewhat, and the herbaceous plants and shrubs and trees which grow in our own forests and along our waysides have been more freely admitted into the aristocratic society of their foreign relatives, and the fact that a plant is common is not always a reproach to it.

Different plants have different values to planters according to the use that is made of them. Landscape-gardening wherever it is practiced over areas of considerable extent deals properly with scenery; that is, with the permanent features of the land—its roll of surface, its sky-line and distance. The greatest artist in landscape is one who with these fundamental elements and the common trees and shrubs and grass makes a picture which is a unit, and every portion of which helps consistently to give expression to a central idea. This differs entirely from what is called decorative gardening, which is concerned more especially with the detailed ornamentation of more limited spaces. For decorative purposes plants and flowers may be grouped into arrangements which kindle admiration on account of their symmetry of form and richness of color. This is the presentation of beauty for its own sake. It appeals to the æsthetic sense alone and not to the imagination, and through it to our higher nature as a landscape picture does. It is not necessary that a decorative group should be in any sense natural, and plants with foliage of strong color or those that can be trained into peculiar shapes or which have an unusual habit are often the most valuable in such places. They are useful just as stones of different form and color are useful in a mosaic. In decorative gardening a plant of Golden Elder or of *Prunus pissardi* may have the highest value, while the same plants in a natural landscape would be worse than useless, and, indeed, might ruin a quiet picture by their obtrusiveness.

There is another kind of gardening, however, which has been called specimen gardening, and which has many attractions to genuine lovers of plants. To such persons a garden exists for its plants rather than the plants for the garden. It is not a landscape picture that is desired, nor yet geometrical designs of pleasing form and color. It is individual plants that are cherished irrespective of their arrangement, and they may be selected for their rarity or their oddity, or for any other quality that appeals to the fancy of the planter. This makes a pleasant diversion, but it is by no means the highest form of gardening. A wise observer once said that it marked a distinct decline in garden art when a gentleman led you to a point on his estate where he could show you the finest *Cryptomeria* in England, instead of conducting you to the point where you might see the most delightful view.

But we have wandered from our purpose. We set out to make a mild protest against the idea that a plant is not desirable if it is common. A great patron of horticulture once declared that he could get up no enthusiasm for Lilacs because they could be seen at every farm-house door. Now, since there are hundreds of varieties of the common Lilac and many distinct species besides, there is opportunity for gathering a collection of these shrubs, which represent a wide diversity of habit as well as in the form and color of their flowers—many of them rare plants which never graced a farmer's yard. But the common Lilac itself will always be a desirable shrub. It has such intrinsic merit that it cannot be vulgarized by mere abundance. Its habit of growth, the graceful way in which its dense panicles of flowers are carried above the thick leaves, their exquisite color, which has no exact duplicate in the vegetable kingdom; the fragrance, which is their own and unmistakable, will always make this a useful plant. It is hardy, long-lived, and will endure abuse; it is often found by a wayside cabin without a single companion, and yet it is beautiful enough to have been the chief ornament of the home of one of our great poets. It is admired because of its many good qualities, and it will be more and more valued for association by every succeeding generation of plant lovers.

The fact is, that for all practical purposes the cheapest plants are the best. Among the novel introductions every year there are some that will stand the test of time, and as soon as they demonstrate their usefulness they will be common. In order to be widely useful a plant must be easily propagated, it must be hardy and long-lived, and these are qualities that will ultimately make it cheap, just as the Tartarian Honeysuckle is cheap, although one of the most beautiful and indispensable of shrubs. Grass is common, but it is an unfailing refreshment to the eye, and it is so universally appreciated that no one considers Ruskin's glowing description pitched on too high a key. No novice need be deterred from planting trees or shrubs on account of the high price of novelties or rarities. If his purse will allow him to import the most expensive sorts he may find pleasure in gratifying his desires in this direction, but if he buys no others he will discover at last that he has but a sickly lot of incongruities. He will learn that the common plants are the basis of every good collection, and that cheap plants are the most effective in producing pictures which are impressive and permanent.

The True Purpose of a Large Public Park.*

THE true purpose of a large public park is to provide for the dwellers in cities convenient opportunity to enjoy beautiful natural scenery and to obtain occasional relief from the nervous strain due to the excessive artificiality of city life.

By large public park is not meant one covering more than a certain number of acres, but one large enough to contain a complete natural landscape, where the boundaries will not be obtrusive; where city conditions will not be unduly apparent; where one may stroll over hill and dale, across meadows and through woods, always amid natural surroundings, for hours, without twice following the same routes; where one may come again and again without becoming familiar with all its interesting localities and natural features; where many thousands of visitors may be enjoying the scenery at the same time without crowding each other; where those who especially seek seclusion may find parts so remote from the boundaries that even if city houses are not completely hidden they become reduced in the distant perspective to inconspicuous proportions as compared with the foliage of trees and other natural objects in the foreground; so remote that the roar of street traffic is less noticeable than the rustle of foliage stirred by the breeze or than the songs of birds and insects.

That the scenery of such a park should be beautiful no one will deny, but that it should be natural needs explanation. There can hardly be such a thing as absolutely natural scenery in a public park near a large city. Fires, pasturing, cultivation, wood-chopping, the destruction or driving away of the wild animals, wild birds and insects, and the introduction of others, have long since ended purely natural conditions about every large city, leaving at best only a general resemblance to natural scenery. Even if a tract of land is still to be found in a comparatively natural condition while in private ownership, it could not remain entirely in that condition after being properly fitted for and used as a public park.

With these limitations in mind, what is meant by the natural scenery of a large public park may be itemized as ordinarily either open meadow, open grassy hillsides or rolling ground, open groves of trees with good turf, dense woods, borders of shrubbery, or low woody or herbaceous undergrowth, water in river, brook, pond or pool, and more rarely cliffs or ledges of rock. These principal features of the scenery again may be divided into their elements of earth or rock surface, water surface and foliage, either ground cover, shrubbery or trees.

In most cases a good deal of grading needs to be done

in places. The original natural surface is wholly or partially destroyed and a new surface is created artificially, but it should be so shaped and finished as to appear natural, or, at least, as closely in harmony with natural surfaces as study and care can make it. Too often, however, through lack of appreciation of the true purpose of a large public park, the grading which must be done, either ignorantly or carelessly, or owing to mistaken ideas as to economy, or owing to personal preference for artificiality, is made as regular and unnatural as possible, so that what might have been done in harmony with the natural scenery antagonizes it and greatly lessens its value for its true purpose. Abundant instances of artificial-looking grading in the wrong place exist in many of our large public parks. The responsibility of park commissioners for this sort of interference with the true purpose of a large public park is generally only in the indirect way of entrusting the work to men not properly trained in park work or by enforcing an unwise economy; for it must be acknowledged that to grade naturally and gracefully usually costs more than to grade formally and stiffly.

The water surfaces of a park need more study and care to make them appear natural in outline and as to their margins than does the general ground surface of the park. Too often park waters are almost as stiff and formal in their outlines and in the shaping of their shores as are the curvilinear distributing reservoirs of waterworks. Here, again, the park commissioners are indirectly responsible for the bad results in consequence of working without the plans and directions of a trained artist or without a foreman trained in producing natural effects in park grading.

The verdure of a large public park is what the eye rests upon almost everywhere, and it is therefore the most important of the natural elements of the scenery. The almost universal ground cover is grass, since no other plant is so well adapted to the purpose of hiding bare earth while enduring, with due care and under sufficient restrictions, the trampling of great numbers of people. But there are places where even grass will not thrive, or where a wilder or more varied effect is desirable. Such cases are very generally ignored in our large public parks owing to a lack of knowledge or of artistic appreciation of the possibilities or requirements of particular cases. If gardeners studied natural scenery more they would almost surely discover many opportunities in parks for the application of what they observed in the country. For instance, a dense natural wood which need not be or cannot be well thinned out sufficiently to permit a good turf to be grown, so that people may properly be allowed to ramble everywhere in it, may often be rendered far more natural and interesting by planting pretty wild flowers in its margins and suitable shrubby undergrowth in its interior. Again, steep, open banks, where it is difficult and expensive, and often unnatural, to maintain turf, can be made far more interesting by the use of low ground-covering plants or shrubbery.

Relief from the nervous strain of an artificial city life is afforded in no way so agreeably and conveniently as by a ramble amid the natural scenery of a large park and by the leisurely contemplation of the landscape. There are many workers in a city who suffer more or less from nervous strain, though often they are not fully aware of it. Where a large public park with ample provisions of natural scenery has been created, it has never failed to be much frequented for this purpose and to afford untold benefit to those who use it. Not only are the quiet and seclusion obtainable in the middle of a large area necessary in affording opportunities for occasional relief from the nervous stress of our artificial city life, but they are necessary to the enjoyment of the landscape of the park. Therefore, not only should conspicuous artificial objects unnecessary for the convenient use of the park be excluded from its natural parts, but noisy and dangerous occupations and amusements should also be kept out of, at least, the middle portions of a large park. In order to have the essential quality of seclusion, a large park should not be attempted on both

* From a paper read before the recent meeting of the Park and Outdoor Art Association of Louisville, Kentucky, by John C. Olmsted, of Brookline, Massachusetts.

sides of a railroad or important city street if it is possible to avoid it, for even if the landscape could be made to seem continuous across the gap the noise would almost destroy the desired seclusion of a considerable part of it. An extent of natural scenery sufficient to afford the sense of quiet and seclusion so beneficial to the city worker can only be secured where the grounds are ample, and therefore this should be the essential characteristic of a large park. It is the one vital reason for the existence of such a park. No number of small parks can possibly answer the same purpose, however useful and even necessary they may be for other reasons.

Even if the true purpose of a large park has been kept in view during the process of selecting the land, determining upon its landscape features, designing its necessary construction and plantations, it is too often lost sight of subsequently, and there is a marked tendency to artificialize the landscape. But whenever it is thought wise for a municipality to provide special attractions, these should be limited in kind and number and be carefully devised. It would not be wise or economical for a city to destroy or injure broad and beautiful park scenery by introducing artificial attractions into it when these could perfectly well be provided in the smaller squares or in special amusement grounds, which could usually be much nearer the centre of population than a large park, and therefore could be used by more people more frequently and more cheaply. It is customary for cities to provide for certain kinds of amusements which are healthful and innocent, and for certain objects that are instructive and entertaining and for some that are artistic and inspiring, and which cannot be or are not usually supplied solely by private effort. Such, for instance, are formal gardens, statuary, conservatories, botanical and zoological gardens, concert groves, electric and other fountains, fireworks and the like; also popular athletic grounds, parade grounds, ball grounds for boys, and facilities for boating and bathing. From motives of expediency it is customary to include arrangements for some of these purposes in large public parks, but they should be placed in their borders, and in such a way that they will do the least possible injury to the more secluded parts of the scenery. Great discrimination is necessary in selecting among these objects those which will least interfere with the primary purpose of a large public park. Those forms of amusement or instructive entertainment requiring large buildings or implying much noise, or which draw large and careless crowds that would be liable to injure the grass and shrubbery and trees of the park, should be excluded. It is good policy to secure suitable lands adjoining a large park which can be held in reserve as sites for public museums, grounds for parades, fireworks, public speaking, baseball and (by flooding in winter) for skating and so on. The park in Brooklyn is exceedingly fortunate in having two very commodious public grounds adjoining it. It is greatly to be desired that other cities should do likewise.

If there were a well-established and clearly recognized custom controlling what artificial features might and what should not be introduced into large public parks, such customs would develop into rules of common law. Or if there had been carefully drawn and detailed statutes passed upon the subject, or if there had been a series of decisions of courts as to what buildings and other objects could legally be introduced into public parks, their true purpose would be more clearly understood. It is true, there has been for years a statute in New York state forbidding the erection of buildings above a certain size not strictly for park purposes in any public park, but the principle upon which this law is based is so little understood that a few generous individuals recently had no difficulty in getting a special law passed which enables them, with the consent of the Park Commissioners, to introduce a great museum of history into one of the most beautiful landscapes of one of the most perfect large public parks in the world. The usual arguments in support of this desecra-

tion have been urged, namely, that the building is for a worthy semi-public object; that the collection it is to contain will be interesting and instructive to the public, and that the building itself will be handsome, and consequently that it will be an ornament to the park. If this argument is sound for one such building it is equally sound for others. In that case a large public park is little more than a tract of beautiful vacant building lots which the public is temporarily enjoying as a playground until it shall be gradually required for one public or semi-public building after another. If there is no principle upon which the advocates of the first semi-public building can be refused a site, there is no logical reason for refusing sites to any subsequent projects of a like sort. The bars once let down, there will be a stampede to secure beautiful building sites free of cost for natural history, art, botanical and other museums; for armories, normal colleges, high, grammar and primary schools, and so on almost indefinitely.

Proposed Enlargement of the Missouri Botanical Garden.

THE project for enlarging the Missouri Botanic Garden is about to be realized, and Professor Trelease has kindly described the main features of the plans now in the hands of the Messrs. Olmsted. In providing for the future of the garden the Director says the three principal objects to be kept in view are "beauty, instructiveness and adaptability to research." He further says of the grounds and plant-houses, "extensions and changes should be conducted on lines decided upon definitely in advance and be adhered to as closely in detail as the ever-changing conditions may permit, so that each step taken shall be part of a definite, carefully considered general plan, the aim being to develop experimentally along all lines, so that inevitable mistakes can be easily detected and promptly rectified." It will be the aim to make the beauty of the grounds a distinct factor in the collection without sacrificing any of its value as an institution of scientific research.

A tract of between eighty and eighty-five acres of farm land, belonging to the Shaw estate, that adjoins the present grounds on the south-west, will form the addition. After reserving space for the necessary farm-buildings, nurseries and compost grounds, the tract is to be divided into three parts. About one acre will be set apart for developing such transient synopses as are found necessary or desirable. Twenty acres will be used for a synopsis of the North American flora, and sixty acres for a general synopsis of the flora of the world.

On the first division certain small synoptical collections will have place as they are required, no one of them being maintained longer than a few years. These collections may represent medicinal, fibre, forage and other economic plants, or they will illustrate certain botanical works or explain various interrelations between plants and animals, such, for instance, as the pollination of flowers; or they may illustrate the dissemination of seeds or the sleep of plants; or they may show how plants climb, how they catch insects and the like.

The second division lies south of the arboretum. Here it is intended to establish and maintain a synopsis of the flora of the United States, arranged as an attractive piece of landscape-gardening. Every order found in the United States, except parasites, will be represented in this section. It will, of course, be impractical to use all the species, but typical genera of each family can be represented by a few hardy, characteristic species, including the most effective, most interesting and most easily cared for. In this synopsis the so-called natural system of classification, as used in Gray's *Manual*, will be followed in the grouping or sequence of the orders. And the main walk will be the thread connecting the groups, some lying along it, others farther back, but all systematically arranged in relation to it, and easily found when the method is understood.

The third division, comprising the not less than sixty remaining acres of the present pasture, will be devoted to the general synopsis of the flora of the world, where it is intended to show every family that can be cultivated in the open air in this climate, omitting all that are included in the North American synopsis except those that are represented only in the United States. Only a few hardy, decorative and easily cared for species of each family will be used. In this synopsis the classification will be according to what Professor Trelease speaks of as the German system, the nearest approach to which is seen in *Pflanzenfamilien* of Engler and Prantl, and it will be the first planting exposition of a system which brings together not only those plants having evident relationship, but those having a common ancestor.

Under this dual system an object-lesson will be given in two types of classification; the vegetation of the United States will be set forth so that every visitor can become familiar with our native flora with the minimum of exertion and time. Besides this, the pleasing landscape effect produced by the artistic grouping of hardy native species on the twenty acres devoted to native plants will teach a third lesson which ought not to be lost upon the visitors to these popular grounds.

As soon as working plans are adopted the twenty-acre tract will be underdrained and graded, and it is hoped that this part of the work can be completed during the present season, so that the trees and the shrubs can be planted next spring, and the herbaceous material the year following. If the walks are completed the fourth year and the lawns the fifth year, by that time some five thousand species will have been established. Just when work on the ground for the general synopsis of the flora of the world will begin it is impossible to say, but it is intended during the present year to increase the greenhouse space and erect a Palm-tower twenty-eight feet square, in which benches will be abandoned, and everything will be planted out. The management expects to build within ten years a large Palm-house and conservatory, to be placed in the arboretum back of the present parterre, which will be enlarged, and opposite the main entrance to the garden.

Brighton, Ill.

Fanny Copley Seavey.

Foreign Correspondence.

London Letter.

CELMISIA MUNROL.—This is one of the handsomest of the many species of *Celmisia* which are natives of Australia and New Zealand, where they are known as "Kid-glove" plants on account of the white felt which clothes the leaves of most of them. Beautiful as they are known to be, however, they have hitherto baffled the collectors who have tried to introduce them into European gardens, plants perishing on the voyage and seeds losing their vitality before they arrive here. Only three species have been introduced, namely, *C. Lindsayi*, figured in *The Botanical Magazine*, t. 7134; *C. spectabilis*, *The Botanical Magazine*, t. 6653, and the species under notice. This was introduced by Messrs. J. Veitch & Sons a few years ago, who have or had a large stock of it. A figure of it was published in *The Botanical Magazine* last year, t. 7496. It is now in flower in a cold greenhouse at Kew, the flowers being three inches across, Daisy-like, with white ray-florets and a small yellow disk. The leaves are lanceolate, nine inches long, covered with silky hairs. It is planted in sandy peat and is kept in a sunny position. The leaves are almost as silvery as those of the Cape Silver Tree.

OLEARIA INSIGNIS.—The Australian and New Zealand genus *Olearia*, which is a near ally of *Celmisia*, is largely represented in European gardens, some of the species forming large shrubs and proving hardy in the warmer parts of England. The species under notice is, however, too tender for out-of-door cultivation here, but in a cold greenhouse it is happy, growing very slowly, ultimately

forming a dwarf thick-stemmed, branched, low shrub, with oblong leathery leaves six inches long, the under side covered with a thick whitish felt. The flower-heads are produced singly on axillary peduncles six inches long; they are shaped like those of the Cornflower, *Centaurea*, and are two inches across, the ray-florets overlapping, toothed at the apex and white, the disk-florets yellow. It will be seen that this species differs very widely from the rest of the cultivated *Olearias*. It is a native of rocky riverbanks in Middle Island, New Zealand, whence it was introduced about ten years ago. There is a good figure of it in *The Garden* for 1888. It is now flowering at Kew.

DIMORPHOTHECA ECKLONIS.—I noted this plant last year as a new introduction from south Africa of subshrubby habit, with large Daisy-like flowers colored purple outside and white within. It was grown at Kew as a summer bedding plant, and attained a height of eighteen inches, flowering freely from July onward till the frost came and killed the plants outright. Some plants grown in pots and wintered in a cold house have been a surprising success, the stems being quite woody at the base, the branches leafy and three feet high, and the flowers most abundant all through the spring. The leaves are lanceolate, toothed and about five inches long, and the flowers, which are three inches across, are an elegant white, with a pale blue disk, the reverse of the ray-florets being purple. They close unless exposed to sunlight, as do the *Gazanias*. Messrs. Veitch & Sons are working up a stock of this plant for distribution. It is easily propagated from cuttings. The Kew plants were raised from seeds collected near Port Elizabeth. A figure prepared from one of them has lately appeared in *The Botanical Magazine*.

CAMPANULA BALCHINIANA.—This pretty little plant obtained a certificate last year when it was shown by Mr. Balchin, of Hassocks, who stated that it originated from a cross between *Campanula fragilis* (*hirsuta*) and *C. isophylla*. I lately saw the plant in quantity, and after careful comparison I am convinced that it is simply a variegated sport from *C. fragilis*. Whatever its origin, however, it is a beautiful addition to the small trailing *Campanulas* which grow freely either in the sheltered border, on the rockery, in pots or in suspended baskets. Every one knows the value of *C. fragilis* for these purposes, and *C. Balchiniana* is *C. fragilis* in everything except leaf-coloration, and in this it is a charming mixture of creamy-white green and rose-pink, the latter color being most conspicuous on the young leaves. I anticipate for this plant much popularity. It will probably be greatly valued for carpet bedding. Grown in baskets it is a superb plant. The stock has been secured by Messrs. Veitch, who are sending it out as a new plant this year.

LESCHENAULTIA BILOBA.—Twenty years ago one might have found half-a-dozen species of *Leschenaultia* among the popular greenhouse plants grown in England; now only one is grown, and that by very few cultivators, most of those who essay its cultivation failing miserably. It may be called a shrubby *Lobelia*, the branches and leaves being soft, otherwise heath-like, and the flowers of a bright sky-blue color. A well-grown specimen is one of the most beautiful of pot-plants. The most successful grower of this species is Mr. Balchin, of Hassocks, near Brighton, in whose nursery I lately saw large batches of it in various sizes. They are grown in the same kind of soil and treated in the same manner as *Erica hyemalis*, with this essential difference: *Leschenaultias* have fleshy roots; they are therefore able to bear drought, and Mr. Balchin says the only secret there is in their management is that they must be kept dry all through the winter. If they flag give them a little water, but do not give them any more until they flag again. In a cool house with an ash bottom they require no water for months.

BORONIA HETEROPHYLLA.—There is no more beautiful greenhouse plant than this. Unfortunately, however, it resembles its congeners in being somewhat difficult to grow, although any one who can manage *Epacris* can



Fig. 27.—*Cladothamnus pyrolæfolius*.—See page 216.

1. A flowering branch, natural size. 2. A fruiting branch, natural size. 3. Vertical section of flower, enlarged. 4. A stamen, front and back views, enlarged.

grow this *Boronia*. The best grower of it that I know treats the plants exactly as he treats *Epacris*—that is, in March or April he cuts them in hard, places them in a warm moist house to break, repots them in a mixture of peat and sand when the new growth is half an inch long, and keeps them warm until July, when they are gradually inured to a lower temperature and more air, and are finally placed in a cold house. Grown in this way plants in five-inch pots are perfect little specimens, eighteen inches high, crowded with branches which are bent over with the profusion of bright rose-crimson bell-shaped flowers. In a cool house the plants bloom in April and remain in flower about two months. This species was introduced to Kew about fifteen years ago by Miss North, who found it wild in West Australia and described it as "very beautiful, scent delicious, quite unknown."

CYPRIPEDIUM SPECTABILE, var. *ALBUM*, a pure white-flowered variety of the Moccasin Flower, is the most attractive Orchid in flower at Kew. It is not what is generally known as the white variety, which has a tinge of rose in the segments, but is pure snow-white. We grow a large number of plants of this *Cypripedium* in pots in a cold house or frame and they flower in May, when they are worthy of a place among the choicest of cool-house Orchids. Of course, we grow it largely in the open air as well. The best examples of it that I have ever seen were growing in boggy soil on the edge of a pond, the treatment being almost sub-aquatic; they were large, healthy clumps of stems two feet high, each bearing two, a few of them three flowers. We also grow them in pots for the cold house and flower them in May; the Japanese Lady's-slipper, *C. Japonicum*, and the large, handsome *C. macranthum* from Siberia, *C. pubescens* and *C. acaule* also flower with us in May when grown in pots.

CYTISUS KEWENSIS.—This is a hybrid between *Cytisus albus*, the white Portuguese Laburnum, and *C. Ardoini*, a yellow-flowered prostrate species from the Maritime Alps. It originated in the Kew Arboretum, where there is now a bed of it in flower. It promises to be a useful plant for the rockery and for small gardens, as it is of dwarf, almost prostrate, habit, with small hairy leaves and cream-yellow flowers, resembling those of *C. præcox* both in size and color. It is perfectly hardy. Some plants of it were shown at the last meeting of the Royal Horticultural Society and were much admired. *C. præcox* is magnificent at Kew now, two very large round masses of it in a conspicuous position on a lawn being literally clouds of pale yellow flowers. It will be remembered that this most useful hardy shrub is the result of a cross between *C. albus* and *C. purgans*.

London.

W. Watson.

New or Little-known Plants.

Cladothamnus pyrolæfolius.

CLADOTHAMNUS is a genus of woody plants of north-western America of the Heath family. The original species, *Cladothamnus pyrolæfolius*,* is distinguished by solitary five-petaled flowers terminal on short leafy branches, or rarely axillary, anthers opening laterally for about half their length with narrow, elongated, terminal pores, and five or six-celled globose capsules. It is a glabrous shrub with slender reddish upright stems from four to ten feet tall, clothed with thin obovate lanceolate mucronulate, nearly sessile, pale green leaves from an inch and a half to two inches and a half in length and about half an inch in width, and flowers nearly an inch across when expanded, their light reddish or pink petals, which are rather longer than the acute foliaceous calyxlobes, being exceedingly evanescent.

Cladothamnus pyrolæfolius grows along the borders of

the upland meadows of Alaska, where it opens its handsome flowers in succession during several weeks in summer.

Professor Green has recently shown that a second species of *Cladothamnus*, long confounded with the Alaskan plant, which he describes as *Cladothamnus campanulatus*,† inhabits the high mountains of Washington and British Columbia, and differs from the type of the genus in the glandular hairs on the margins of the sepals, in its campanulate corolla with petals joined into a short tube, and in the dehiscence of the anthers, which open only by large terminal pores. The leaves are short-stalked and clothed on the under surface of the veins and on the petals with reddish hairs, and the flowers are solitary, in pairs, or in threes, from lateral buds, and are borne on short hirsute pedicels.

Cladothamnus has probably not been successfully introduced into gardens. The Alaskan species might flourish in those of western Europe, although it would probably not thrive in the eastern states. The other, which appears to be a rare plant, might possibly grow in our gardens, where the attempt to cultivate it is certainly worth making. Our figure of *Cladothamnus pyrolæfolius*, on page 215 of this issue, is from a drawing made by Mr. Faxon from a specimen collected by Mr. M. W. Gorman in 1893 on the woody borders of upland meadows near Short Bay, Alaska.

C. S. S.

Cultural Department.

The Rock Garden in May.

THE rock garden is never more interesting than during the month of May. The Moss Pinks, forms of *Phlox subulata*, are in the height of their beauty; compacta, pink; atropurpurea, purple; Fairy, white, tinted with rose; Model, carmine; The Bride, white; and Sadie, a lovely true blue, a sport from *Phlox subulata nivalis*. The color-contrasts obtained by planting these with Iceland Poppies, bright yellow *Alyssum Gemoneuse*, perennial Candytufts and scattered Columbine is truly charming. *Anchusa Barretieri* is new to us and one of the handsomest Alkanets we have ever grown. It is comparatively dwarf, not more than a foot and a half in height and bushy and free. Like the majority of the Borageworts, to which family the Alkanets belong, the flowers are deep blue. Columbines (*Aquilegia*) in variety are an attractive feature, but of late years the borers have destroyed large numbers of plants, and to keep up a display of the choicer kinds losses must continually be made good from our reserve garden. The *chrysantha* × *cerulea* hybrids are hardy and free, giving all the shades possible between blue and yellow. Whatever may be said against the natural crossing of the different types of these plants, they are at least interesting, and to the uninitiated just as handsome. The distinct but commoner *Aquilegia Canadensis* has been improved by the infusion of alien blood, so that now we have varieties with larger flowers, mostly later blooming, and varied colors. The true *A. Olympica*, blue and white, is one of the handsomest Columbines. *Iris verna*, sweet-scented, lavender-flowered—an American species—is among the prettiest of dwarf Irises. *I. oxysepala* is a hardy Siberian kind with slender tough leaves and lilac-colored flower. *Centaurea montana*, with heads of blue, and silvery foliage, is worthy a place anywhere. *Verbascum phœniceum*, in bloom, is curious, if not beautiful; all its leaves are radical, primrose-like, hugging the ground in a rosette, from the centre of which comes a leafless scape a foot or more in height, with rotate flowers for the most of its length in colors varying from dull purple to white. *Viola cornuta*, in several varieties—Perfection, mauve; Magnifica, purple, and Lutea—is continually in bloom. Neat-habited, healthy plants like these are always pleasing. *Phlox reptans* and *P. amœna* are two rosy-colored varieties, and *P. divaricata* comes in shades between blue and white. Besides the Iceland Poppies, which we have had from the opening of spring and shall have until autumn, there will be a temporary display of the gorgeous oriental kinds in crimson and orange tints, while *Papaver rupifragum* gives orange-red flowers with an indescribable sheen like changeable silk. About the same time the pale yellow Day Lily, *Hemerocallis graminea*, will be in bloom. The yellow Globe Flowers, *Trollius*, are handsome, never untidy, and continue

* Bongard, *Mém. Phys. Math. et Nat.*, pt. II.; *Acad. Sci. St. Pétersbourg*, II., 37, t. 1 (*Fl. Alaska*) (1831).—Gray, *Syn. Fl. N. Am.*, II., pt. I., 44, in part.—M. W. Gorman, *Pittonia*, III., 75.

Tolmiea occidentalis, Hooker, *Fl. Bor. Am.*, II., 41 (1834).

† *Cladothamnus campanulatus*, Green, *Erythra*, III., 65 (1895).

in bloom a long time. The incurved Buttercup-like flowers are useful for cutting and last well. *Anemone umbellata* is new; the color of its flowers is between yellow and green, and though it may not be handsome, its habit is good, and among a number of types there is room for it. Scattered tufts of the Fire Pink, *Silene virginica*, give touches of scarlet, and the handsome *S. pennsylvanica* is not to be despised because it is common. The true Pinks, *Dianthus*, are in bud, and in a few days we shall have the Ragged Robin, *Lychnis flosculi*; Bachelor's Button, the double-flowered *L. diurna*, and the German Catchfly, *L. viscaria*, fully out.

Wellesley, Mass.

T. D. Hatfield.

A Few Roses.

ONE welcomes the first Roses not alone for their beauty, but also as an indication of genial weather. The early Roses have a perennial charm and a beauty all their own. Though the species have been known a long time, and are not rare, they seem to be cultivated mostly in large plantations, and make their way slowly into small gardens. Owing to the cool weather, *Rosa rugosa* did not precede the other species at as long an interval as usual, and the Burnet Rose, *R. spinosissima*, followed it closely. This charming little Rose is perfectly hardy, with single creamy white flowers. The leaves are small and the thin stems bear enough prickles to merit its specific name as the very spiniest. It makes a neat bush about three feet high, and is always a striking plant in the hardy border. It is to be had readily from seed, in which way it strayed into my garden from Tenby. I have been told by a high authority that Polyantha Roses are not of much account, but there is in the border a Remontant form or hybrid of this Rose which could not well be spared. It is very hardy, forms a bush about three feet high, and bears, during the season, frequent crops of small single flowers of a beautiful pink color.

Another hybrid much valued here is the Dawson Rose, which is now coming into flower. If allowed to grow naturally this is a most beautiful plant at flowering time, when its long shoots are covered with small semidouble pink flowers in clusters, the buds opening in succession. A spray six to nine feet long makes a glorious decoration, and the old wood will soon disappear for that service, much to the relief of my helper, who objects seriously to untrammelled growths. But the growth of this Rose is slight in comparison with that of *Rosa multiflora*, which in wild luxuriance covers twenty-five feet or more of fence, and would probably spread over the entire garden if left unchecked. One is sorry to touch knife to a plant which evidently so enjoys life and in a few days will be covered with myriads of fragrant blossoms. A few, at least, of the large number of single Roses should be in every garden.

The general culture of Roses offers some difficulties in this climate, owing to hot summers and to the special fondness of many species of insects for their foliage. It has always seemed to me that if the small grower would exchange most of his Hardy Perpetual Roses (usually bought under the impression that they were perpetual bloomers) for Teas or hybrid Teas he would have more satisfaction and rid his garden of some unsightly objects, for after the Rose season the plants are usually neglected. Tea Roses produce flowers all the season, and, naturally, their wants are more apt to receive attention. Perhaps, on reflection, that hint will not be of much service farther north than this, though among the Teas some will be found much harder than others. *La France* requires no protection here; neither does *Auguste Guinoisseau* (the alleged white *La France*). There are other surviving Tea Roses in the garden, but the most interesting and promising one is the comparatively new *Kaiserin Augusta*; ten plants which came through last winter untouched are now growing strongly and are full of well-developed buds. This variety produces an abundance of handsome white flowers continuously during the season, and I know of no Rose of its color which is more likely to give complete satisfaction.

Elizabeth, N. J.

J. N. Gerard.

Crinum amabile and *C. Asiaticum*.

CRINUM AMABILE has been much admired in the Palm-house here for the past two or three weeks. This is a noble plant, and when well grown its foliage is strikingly handsome, even when it is not in flower, and when its flowers are open their presence is made known to any one who enters the house where the plant is grown by their delightful fragrance, even before they are seen. This is by no means a new plant, since it was introduced to Europe over fourscore years ago from Sumatra. This genus *Crinum* belongs to the *Amaryllis* family, and the part underground, or bulb, is not very

large. It has a neck about a foot in length, however, and is nine or ten inches in circumference. Its thick, dark green leaves measure four feet in length and four inches in breadth, and they taper gradually to a point. They also arch gracefully and add much to the appearance of the plant. The scapes measure about three feet long and are crowned with umbels consisting of about two dozen flowers. The perianth tube is bright red and is four inches long, and the segments are the same length and color and revolute. The flowers in the umbel do not open all at the same time, and therefore the flowering season is in this way very much lengthened.

Another truly noble *Crinum* which ought to be in blossom in another week is *C. Asiaticum*. The bulb of this plant measures about five inches in diameter and has a neck about a foot in length. Its deep green leaves are long and arching. The plant grown here is about four and a half feet in height and nearly the same in breadth; the flowers are white and produced in umbels of about fifteen to twenty flowers.

Crinums thrive in a compost of turfy loam, dry cow-manure and a little charcoal. When they are grown in large pots they do not require annual repotting; in fact, our large plants have not been shifted for the past five years. A top-dressing of good rich soil is all that is necessary, and when they are well established liquid-manure is very beneficial. When the plants are growing they need an abundant supply of water. For large greenhouses where there is plenty of room these stately *Crinums* associate well with such plants as Palms, Cycads, Bananas and *Dracenas*.

Harvard Botanic Garden, Cambridge, Mass.

Robert Cameron.

April Irises.

WITH reference to the article on page 167, allow me to state that my description of the color of the flowers of *Iris Assyriaca* is based on an average. Among a hundred bulbs twenty are pure white, twenty more milk white, and the rest a bluish white. It is earlier than *I. Sindjarensis*, and if kept dry for three months a very free bloomer. I wonder my friend Mr. Gerard does not mention *I. Bosniaca*, which, although of the rhizomatous section, is here in flower from the 15th of April onward; it is rich, free-flowering, of a soft lemon-color, and the flowers are comparatively large, much better than any in the *Primula* section, and standing slight frosty nights unharmed. To these spring-flowering Irises the central Asiatic species, *I. Korolkowi*, *I. vaga*, *I. stolonifera* and *I. Leichtlinii* form a connection with the later-flowering kinds of the rhizomatous section. The climate of the United States of America seems to coincide perfectly with the wants of these Irises.

Baden-Baden.

Max Leichtlin.

Propagating Lilacs.—Referring to the notes on Lilacs and Privet in the last issue of GARDEN AND FOREST, I would say that while it is plain that the Privet cannot be recommended as stock where it is not hardy, there are many reasons to justify its use elsewhere. In the first place, nurserymen use it because there is no other way to get up a stock of the newer kinds as quickly; but this is not the only reason. The Privet dwarfs the Lilacs and causes them to flower in a very short time, and in a profuse way that rarely occurs when on their own roots, and as dwarf shrubs they are available for a great many purposes. Florists use them for forcing, with certainty of their flowering. As they are usually budded close to the ground they can be set below the union and thus form roots from the Lilac scion, as is often done in the case of the dwarf Pear.

Germantown, Pa.

Joseph Meehan.

Correspondence.

The San José Scale Disease.

To the Editor of GARDEN AND FOREST:

Sir,—On page 200 of the current volume of GARDEN AND FOREST is a note taken from *The Country Gentleman* regarding this interesting topic. I have a bulletin almost completed on this subject, but an unusual demand has been placed on my time this spring, making it difficult to complete the manuscript. It was my intention not to announce this valuable discovery until the bulletin appeared, but a portion of my report to the Florida Horticultural Society was on this subject, and that seems to have thwarted my purposes.

The earliest intimation of this disease was observed in 1895, but the discovery and experiments were not made until 1896. The experiments indicate that this fungus (*Sphaerostilbe cocophila*, Tul.) is an effective and practical remedy for this

scale in Florida, but we are by no means assured that it will be of any value in the north, either east or west. Since, however, extensive experiments are already under way in the east and west, we may look for reports from these sections in reasonable time.

The subject is of such importance that to give information and prevent misconceptions I offer the following general remarks:

1. The success attained by using this fungus from cultures makes it a promising remedy against the San José scale.
2. It is "nature's own remedy," and all that we do is to disseminate it properly.
3. It was discovered on a native scale (*Aspidiotus obscurus*, Coms.) at Lake City by Mr. A. L. Quaintance. Later finds indicate that it is quite generally distributed on these scales (*A. obscurus*) at Lake City and at De Funiak.
4. The fact that it is native to this state insures a constant source of supply and obviates the use of cultures that might have become attenuated.
5. Bread culture can be produced in large quantities at a slight expense.
6. The fungus will doubtless prove an excellent remedy in California.
7. As the scales are killed they wash from the tree, leaving the bark clean and free.
8. Most of the applications of this fungus were made by orchardists, proving that it is possible for the fruit grower who may not be a scientist to apply the laboratory-grown material properly.

Copies of our bulletin may be obtained upon application to O. Clute, Director of Experiment Station, Lake City, Florida.

Lake City, Fla.

P. H. Rolfs.

May Flowers in Southern Michigan.

To the Editor of GARDEN AND FOREST:

Sir,—The cool weather which has prevailed since frost departed has prolonged the time of April flowers here well into May. In a wooded situation, on the 19th, I found masses of *Phlox subulata* spread over the sandy beach of a lake for rods in extent, giving its share of sweetness to the breeze. The beautiful scarlet pendent flowers of the wild Columbine were swinging everywhere among the delicate greens. For grace and delicacy of flower and leaf the early Meadow Rue, *Thalictrum dioicum*, could scarcely be surpassed as it hung fringing the edge of a shelving bank. *Geranium maculatum* scattered brightness here and there, with *Lithospermum hirtum* close at hand. *Smilacina stellata*, which grew in profusion and exhaled a fragrance somewhat like Lily-of-the-valley. An early Vetch, *Vicia Americana*, is a pretty climber well worthy a place in the garden; it is graceful in vases and keeps well; *Lonicera parviflora*, var. *Douglasii*, was the only Honeysuckle noted in bloom at this date. The flowers are dark red, tinged with yellow. *Actea spicata*, var. *rubra*, has a globular cluster of flowers, white in all their parts except the rather prominent scarlet stigma. The conspicuous fruit of both the *Acteas* in this region makes them desirable for the shady border of a garden. Blue Violets made mats among the shrubs, and more rarely the beautiful *Viola pedata* was seen. Climbers of many kinds are plentiful in all wild places hereabout, and it is surprising that farm-houses so generally lack these graceful decorations. They give to a very humble dwelling a cheerful aspect not attainable by other means.

White Pigeon, Mich.

Dorcas E. Collins.

Forest Preservation.

To the Editor of GARDEN AND FOREST:

Sir,—It is well known that scientific forestry, while promising only a very small profit on forest capital, is calculated at the same time to make that profit continuous. This offers little inducement to individuals, unless they be rich and desire the forest more than the income; but the National Government, being long-lived, can afford to wait. Towns and communities are in a somewhat similar position, and it would seem only natural for them to provide for a continuous revenue by securing suitable forest land in their vicinity. This ought not to be delayed too long, for with the increase in population and the decrease in forests the prices of forest land will be constantly rising; besides, it will require years to put a "natural" forest into a "normal" state (scientifically speaking).

Of course there are other reasons, often much more significant, for forest preservation. It would be unwise, I think, for a town to acquire forest property for revenue when the same

forest might fitly provide for a future rural park or pleasure-ground. My suggestion is made in the hope that some more of our woods may be saved from general destruction.

Muenden, Germany.

G. F. S.

Current Literature.

The Cultivation of Plums.

THE literature on the growing of Plums in this country is very scanty for the reason, perhaps, that the cultivation of this fruit has hardly advanced beyond the experimental stage, except in a few places like western New York and on the Pacific coast. Professor Bailey's notes upon Plums, which have just been published as Bulletin 131 of the Cornell Experiment Station, are therefore very timely. The notes begin by grouping the various types, and this arrangement shows at once how complicated the subject is botanically owing to the number of distinct species from which the cultivated varieties have been derived. The following groups are named:

(1) *Domestica* or European type, *Prunus domestica*. Native to western Asia. Comprises the common or old-time Plums, such as Green Gage, Lombard, Bradshaw, Yellow Egg, Damsons and the like. The leading Plums from Lake Michigan eastward and north of the Ohio and on the Pacific slope.

(2) The Myrobalan or Cherry-plum type, *Prunus cerasifera*. Native to south-eastern Europe or south-western Asia. Much used for stocks upon which to bud Plums, and also the parent of a few named varieties, like Golden Cherry; De Caradeuc and Marianna are either offshoots of it or hybrids between it and one of the native Plums.

(3) Japanese type, *Prunus triflora*. Probably native to China. The type seems to be generally adapted to the United States, and will certainly be of great value to both the south and north.

(4) The Apricot or Simon Plum, *Prunus Simonii*. Native to China. Widely disseminated in this country, but little grown except, perhaps, in parts of California.

(5) The American type, *Prunus Americana*. The common wild Plum of the north, and extending westward to the Rocky Mountains and southward to the Gulf and Texas. Admirably adapted to climates too severe for the *Domestica* Plums, as the plains and the upper Mississippi Valley.

(6) The Wild Goose or Hortulana type, *Prunus hortulana*. A mongrel type of Plums, comprising such kinds as Wild Goose, Wayland, Moreman, Miner and Golden Beauty. No doubt, hybrids of the last and the next.

(7) The Chickasaw type, *Prunus angustifolia* (or *P. Chicasa*). Native to the southern states, and there cultivated (from southern Delaware southward) in such varieties as Newman, Caddo Chief and Lone Star.

(8) The Sand Plum, *Prunus Watsoni*. Native to Kansas and Nebraska. A bush-like species, little known in cultivation. A hybrid of this and the western Sand Cherry is the Utah Hybrid Cherry.

(9) The Beach Plum, *Prunus maritima*. Native to the coast from New Brunswick to Virginia. In cultivation represented by the unimportant Bassett's American; also as an ornamental plant.

(10) The Pacific coast Plum, *Prunus subcordata*. Native to Oregon and California. Sparingly known in cultivation, chiefly in the form known as the Sisson Plum (var. *Kelloggii*).

With these ten types coming into cultivation in the rapidly enlarging fruit zones of our immense country, who can prophesy what the final outcome as to types and varieties may be?

This bulletin treats chiefly of the common European type, which includes (1) the Damsons, with small firm fruit, of various colors, borne in clusters, and generally having small leaves; (2) the Green Gages, of which the Reine Claude is the commonest representative in New York, but comprising various other plums which are smallish, green or yellowish green, spherical and of high quality; (3) large yellow plums, such as Coe's Golden Drop and Washington; (4) large colored plums, red, blue or purple, like the Blue Prunes, Lombard, Bradshaw and Quackenboss. These will always be the leading types for western New York, although the Japanese varieties will be useful in adding variety to the list because they have many early varieties, and the fruit is so firm that it carries well. Besides this, the trees are vigorous, very productive and less liable to black-knot and shot-hole fungus than are those of the *Domestica* type. The *Americana* Plums are more hardy than either, but they are not to be recommended for market cultivation in New York because they are inferior to the others in quality, and their superior hardiness counts for little since the winters are rarely so cold as to injure the *Domesticas*.

The plum is a fruit which has no regular standing in the market as pears and apples have, and depends more or less for sale upon the general supply of other fruits. This means that since the plum is of secondary importance in the market commercial growers can easily plant too many trees. The Plum thrives on a great variety of soils, but does best on clayey loam, and usually upon land suited to Pears, or the heavier soils upon which Apples will flourish. The greater number of trees grown in New York are grown on Myrobalan stock, a native of south-eastern Europe and south-western Asia. There are some varieties, however, which overgrow the stock so that it is likely to sprout from the ground and cause trouble. Professor Bailey thinks that the Domestica Plum itself is the ideal stock, although it is difficult to secure seed, and the stock is variable and rather likely to be injured in the nurseries by leaf fungi. It is for this reason that the Myrobalan has supplanted it. The Peach is largely used as a stock in the southern states and is gaining favor in New York. It is probably better on sandy lands than the Myrobalan, although some varieties, like the Lombard and French Damson, do not unite well with the Peach. Many varieties of Plums are such slow and crooked growers in the nursery that it is advisable to graft them on some strong straight stock, and the Lombard is undoubtedly the best for this purpose. Plum-trees are usually planted when two years old from the bud, although some of the strong-growing kinds may be planted at a year old. They should be set as far apart as Peaches are—that is, from fifteen to eighteen feet apart each way, or they may be planted eighteen or twenty feet apart one way or from ten to twelve feet apart the other, in which case cultivation in one direction is eventually stopped. When planted the trees are pruned in the same way as Apple-trees are, and it is advisable generally to start tops as low as possible and yet allow the working of the curculio catcher below them. After four or five main limbs have been allowed to form the framework of the top, the central stem is often cut out, but it may be allowed to remain. If the trees become too tall and whip-like they may be headed in, but it ought to be remembered that this upward growth commonly ceases and the tree begins to spread when bearing time arrives. If they seem to be making too vigorous growth it is better to withhold fertilizers or cultivation than to stop it by heading them in, since this only makes the growth stronger.

The black-knot is best kept in check by systematically cutting it out wherever seen, and if the trees are thoroughly sprayed every year with Bordeaux mixture for the leaf-blight the black-knot will make comparatively few inroads into the orchard. The blight which causes the leaves to fall in August or September is one of the most serious diseases of the Plum, but it can be kept in check by spraying with Bordeaux mixture two or three times during the summer. The fruit-rot is also the work of a fungus; the dead and dried fruit may often be seen hanging on a tree all winter, and in such cases it is probable that the fruit-spur will be killed. In handling this disease it must be remembered that some varieties are more susceptible than others. The Lombard is one of the worst. Again, if the fruit grows in dense clusters the disease is more apt to be severe, and therefore the thinning of the fruit is an admirable preventive of this as well as an efficient means of increasing the size and quality of the fruit. The specific treatment for the disease is to spray with the Bordeaux mixture.

The Plum scale has created much alarm, and, although formidable, it may be held in check by thorough spraying with strong kerosene emulsion in the winter-time. Curculio is the most widely known enemy of the fruit. The mature beetle lays eggs in the fruits when they are small; these hatch, and the little maggot bores into them. Attacked fruits ordinarily fall, but if they are not stung until they are half-grown they may adhere to the tree, when they will be wormy and gummy at picking time. Taking advantage of the fact that the mature beetles are sluggish in the morning they may be jarred into sheets or canvas hoppers, which can be moved from tree to tree upon a wheelbarrow-like frame. There is a slit in one side of the hopper which allows the tree to stand in the middle of the canvas, and then two or three sharp jars with a padded pole or mallet will bring the insects down, and they roll into a tin receptacle at the apex of the hopper. An active man can attend to three hundred or four hundred full-bearing trees in six hours.

The most popular variety of Plum, and one of the poorest, is the Lombard. Its merits are its great productiveness, vigor and hardiness. The fruit is only fair in quality, and it ripens when the market is full. It is very susceptible to the leaf-blight and fruit-rot, and yet many orchards planted with this variety exclusively have been successful commercially. Perhaps varieties which are specially early or late and those

which have pronounced colors, especially dark red or purple, will prove the best market fruits. Some dark yellow varieties are also salable, but those of an ill-defined reddish color, brown or light yellow are usually not profitable. And yet the Reine Claude is a yellowish green plum. It is saved, however, by its established reputation as a culinary variety. So far as known, Plums of the Domestica and Japanese type are self-fertile, but it is always the safest course to plant varieties in alternate rows.

These notes of Professor Bailey's are supplemented by a descriptive list of varieties by Mr. S. D. Willard, who is an excellent observer, and who has had such a long experience in plum-growing that he is a recognized authority in the matter. At various times the Cornell station has published bulletins on particular phases of plum-growing, and these are all referred to in their proper place, so that this little treatise will be found very complete and useful.

Recent Publications.

The Fertility of the Land. By Isaac Phillips Roberts, Director of the College of Agriculture and Professor of Agriculture in Cornell University. The MacMillan Company. 1897.

This is the latest publication of the admirable Rural Science Series, which is edited by Professor Bailey, and its purpose is well set forth in the subtitle as a Summary Sketch of the Relationship of Farm Practice to Maintaining and Increasing the Productiveness of the Soil. We do not mean that because the work is specifically devoted to certain phases of farm practice it ignores agricultural science. On the contrary, the treasures of science are continually drawn upon to explain the fundamental reasons for the ordinary operations of the farm. The very first chapter, entitled "An Inventory of Land," ought to prove of fascinating interest to a young farmer who has never made any estimate of the amount of plant food that is found generally in soils, or of what sort of food and how much of it is required by his crops, or how stores of potential fertility in soil and subsoil can be made available, or how one can learn what elements ought to be added to maintain the supply and increase its usefulness. All this is science, but it is applied science, and science so skillfully adapted to everyday use that it becomes the very philosophy of farm practice. The next chapter on the evolution of the plow and its use in tillage shows how the moving of the soil in the right time and in the right way helps his land in a hundred subtle ways of which the thoughtless farmer has never dreamed. In short, the book will be found helpful to the farmer in that it will enable him to go through the routine of his everyday work with intelligence, and therefore with skill and the assurance of wider success. In an editor's preface, Professor Bailey speaks of the book as the ripened judgment of the wisest farmer he has known. We are told that Professor Roberts has been a successful farmer at the same time that he has been a successful teacher of agriculture and a distinguished experimenter. He has also had the advantage of travel, and therefore his opinions on farm methods ought to be of value. He has the philosophic temper, too, which has moved him to inquire into reasons and results. His book, then, is a record of his own experience and the experience of others in maintaining the productivity of the land; and since this is the fundamental problem in practical farming, its discussion throws light on so many details of farm practice that we agree with Professor Bailey when he says that the book comes as near being a treatise on agriculture as any single volume can be.

Occasionally one comes upon a bit of moralizing that seems a little out of place, or a generalization which the data hardly justify, or a crude statement now and then such as one trained in early life to scientific thinking would not make, but, taken as a whole, it is a singularly useful volume which covers a wide range of subjects, all of which are treated succinctly and yet clearly and with a due regard to their relative importance.

Notes.

The number of visitors to the Zoölogical Gardens in Regents Park, London, during the year 1896 was 665,000. The Aquarium of this city has been open less than six months and the visitors so far number more than 700,000.

One of the late farmers' bulletins, issued by the United States Department of Agriculture, is entitled "How to Grow Mushrooms," and has been prepared by William Falconer. It is a miniature treatise comprised within twenty pages, but it gives concise directions for every process, from the preparation of the bed to the transportation of the crop to market in an attractive condition.

This has been an unusually favorable spring for flowering shrubs, since there has been no hot period to force them into bloom, and the flowers have had opportunity to develop slowly, attain their best form and remain a long time. The Virginia Fringe-tree, *Chionanthus Virginica*, is particularly beautiful. Its panicles of pure white flowers hang long and full, and in such numbers as to cover the tree completely as with a mist of snow. The Fringe-tree is dilatory about unfolding its leaves, but, apart from this fault, it is one of the very best of our small trees. Its habit is good, its leaves clean and healthy, its individual flowers delicately beautiful and the flower-clusters unexcelled in grace.

In response to invitations issued to various landscape-architects, park commissioners, city engineers and others who take an interest in public pleasure-grounds, a convention was held at Louisville, Kentucky, on the 20th and 21st of May, at which many interesting papers were read, and, after a full discussion, a society was formed, to be known as the Park and Outdoor Art Association. The following officers of the permanent organization were elected: President, J. B. Castleman, of Louisville, Kentucky; Vice-President, L. E. Holden, of Cleveland, Ohio; Secretary and Treasurer, Warren H. Manning, of Brookline, Massachusetts. The membership fee was fixed at \$2.00 a year, and all persons who desire the advancement of art out-of-doors, including land-owners, park officers, village improvement societies and the like, are invited to unite with the association.

Excepting Lima beans and sugar corn, all the summer vegetables are now in the New York markets, and sweet and white potatoes are almost the only old-crop vegetables still offered. Beets, asparagus and peas all come from fields as near by as New Jersey and Long Island, besides radishes and rhubarb. String-beans and cucumbers come from Georgia and South Carolina, and eggplants, squashes, tomatoes and celery from Florida. Cabbage is coming from Virginia in large quantities. Other vegetables in season are new kohlrabi, carrots, turnips, cauliflower, celeriac, okra and peppers, and onions from Louisiana, Egypt and Bermuda. Vegetables for "greens" and for soups, salads and sauces are offered in almost endless variety, as beet-tops, spinach, sorrel, young celery, parsley, chives, tarragon, mint, tansy, dandelion, cress, lettuce and endive. Mushrooms continue plentiful, and sell for fifty cents a pound.

The Orchid Review gives an account of some interesting observations which have been recently made at Kew by Mr. Griessens, who has charge of the Orchid-house there. He caught a bumblebee with three different kinds of pollinia attached to it. Between the eyes were two pairs from some *Odontoglossum*, on the middle of the thorax four pollinia of a *Cattleya*, and on the back of the thorax between the wings, those of some *Vanda*, which proves that the bee fed among various species. Another interesting example was that of a common bluebottle fly with the pollinia of a *Cirrhopetalum* affixed to the middle of its thorax. The flower had evidently attracted the insect by its foetid odor. Professor Rolfe gives other examples which have been witnessed, and he well remarks that here is an interesting field of inquiry for all who have an opportunity of observing the fertilization of Orchids in their native homes.

Professor Trelease invites the attention of botanists to the facilities afforded for research at the Missouri Botanical Garden. A large number of native and exotic species and horticultural varieties are grown in the garden, the arboretum and the adjoining park, and the native flora accessible from St. Louis is large and varied. The herbarium includes 250,000 specimens, representing the vegetable life of Europe and America, and it is supplemented by a collection of woods, including veneer transparencies and slides for the microscope. The library

contains 12,000 volumes, 13,000 pamphlets and a complete authors' catalogue. These facilities are at the disposal of professors of botany and others competent to carry on research work of value in botany or horticulture, subject only to such restrictions as are necessary to protect the property of the garden from injury and loss. Persons who wish to make use of them are invited to correspond with the Director, outlining, as far as possible, the work they wish to do, and giving notice, so that provision may be made for the study of special subjects.

Mr. L. F. Kinney, Horticulturist of the Rhode Island Experiment Station, has been observing the Loganberry, which was described with some fullness nearly three years ago (vol. vii., p. 466) in this journal. In an interesting bulletin just issued on the subject, Mr. Kinney publishes a letter from Judge J. H. Logan, of Santa Cruz, California, who planted the seed from which it originated in 1881. The letter gives an interesting account of the plant, which is supposed to be a hybrid between a variety of the European Raspberry and a variety of the wild Blackberry of the Pacific coast. It has been called the Red Blackberry, and the fruit, which is shaped like that of a Blackberry, has a slight but distinct raspberry flavor. The fruit ripens in Rhode Island a trifle later than raspberries and lasts a little longer. It is not highly flavored, but is admirable when cooked, and as a sauce fruit it excels both the blackberry and the raspberry. As the canes trail on the ground naturally some provision must be made for keeping the fruit clean, and it seems to succeed well on a trellis of galvanized iron wire. The trailing and flexible texture of the Loganberry canes makes it easy to cover them, a process which is perhaps advisable in all localities north of this city, for instance, where it might winter-kill. The plant is propagated by stolons, although the seeds germinate readily. Unfortunately, however, the seedlings are comparatively worthless when grown for fruit. Altogether, the Loganberry is the most promising of the new types of small fruit that have been introduced within recent years.

Steamer baskets in the fancy-fruit stores, made up for travelers, are showy with a wide variety of the smaller fruits. One observed on Saturday contained rough-skinned Siam oranges, peaches, Black Hamburg and Almeria grapes, the latter a special favorite with voyagers, California cherries, pears and bright Northern Spy apples. Even so early in the season many of the summer fruits are represented in the fruit stores and markets, although some are yet far from being at their best. Peento, Honey Sweet and Bidwell peaches are coming from Florida, and the first Hale peaches, from Georgia. Other Florida shipments are muskmelons and watermelons. Wild Goose plums, from Georgia, are offered, and blackberries and huckleberries from North Carolina. Green gooseberries come from Maryland. The first North Carolina cherries were seen here on Saturday, but did not rival the large and firm California fruit. The strawberry season is at its height, although there is no ripe fruit from this state. The North Carolina season has passed and the best berries are from Maryland, Delaware and New Jersey. Prices range from ten cents for berries of fair quality to thirty cents for a quart box of large, firm, bright, highly flavored fruit of choice varieties. Some Pringle apricots, from California, were seen here last week, small, and with no value beyond their rarity at this time of year. Valencia seedling oranges, from California, the choicest oranges now in season, cost seventy-five cents a dozen. They are juicy, of excellent flavor and almost seedless. The last Easter Beurre pears cost \$1.00 to \$1.50 a dozen, and the long-keeping P. Barry bring the same price. Above 100,000 bunches of bananas reached this port last week; this fruit is low-priced and is fully grown and of rich flavor. Pineapples are also abundant and cheap, and are coming from the Bahamas, Cuba and Florida. The small sort known as Red Spanish, while less handsome, is preferred by some good judges for its superior quality. These cost from fifteen to forty cents each. Abacca pineapples, of larger size, sell for fifty cents each, and Victoria, the extremely large long fruit, often called Porto Rico, bring \$1.00 each. Among the most costly offerings are hothouse grapes, which sell for \$2.50 a pound. These are seen in unusual variety, including Black Hamburg, the White Muscat of Alexandria, the amber-colored, musky-flavored Muscat of Hamburg, and Dacon Supert with berries round and of clear pale green, unless fully ripe, when they have a yellowish tint. A novelty for dinners and luncheons, designed by one of the uptown fruiterers, is hothouse peaches, each fruit set in a little nest with a dainty paper lining, and marked with the name of the guest in blue and gold.

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The Latest Forest Legislation.

LAST week the National House of Representatives adopted the report of the Conference Committee appointed to adjust the differences of opinion between the two Houses of Congress respecting the forest reservation amendment which had been mounted as a rider on the Sundry Civil Bill. As we understand the situation now, President Cleveland's proclamation of February 22d is suspended for nine months so far as it relates to eleven of the thirteen forest reservations set apart by executive order, and is only operative in the two which are situated in California. This action was, no doubt, taken because it was urged that time was needed to give settlers within the boundaries of the proposed reserves or near them an opportunity to perfect their titles, but its practical operation will be to give the great mining and lumber companies opportunity to get hold of all the timber they need so that they can continue as they have done to get their forest supplies from land that belongs to the people. It is also an advertisement for everybody else to rush in and seize all they can get hold of, after which, in the language of the amendment, "lands embraced in such reservations not otherwise disposed of before March 1st, 1898, shall again become subject to the operations of the proclamation." This means that the state forest lands will be given over to spoliation and speculation, as far as practicable, until that date, when, unless Congress passes some worse law at the next session, the remnants of the forests within these eleven reserves will be again withdrawn from sale and entry. The amendment embraces many other features, such as providing for certain surveys, empowering the Secretary of the Interior to sell timber off of all the reservations, old and new, to issue permits which will enable miners, prospectors and residents to take what timber they need. Prospecting, road-building and selling of agricultural lands are also authorized. Of course, it is a violation of the first principles of safe legislation to add to an appropriation bill such an important and complicated measure as this. Besides setting aside President Cleveland's action, it clothes the Secretary of the Interior with power to establish a system of forest administration in the old reservations, and a system based on questionable principles, to say the least, and gives him no funds to carry it out.

And all this was done without any consideration of the report of the committee of the National Academy of Sciences which had been employed by the Government to examine the subject and give such counsel as the facts in their judgment warranted.

This report was presented to the Secretary of the Interior on the 1st of May, and a limited edition has just been issued. The report proper is comprised within thirty pages, but it is long enough to furnish ample data for the justification of all its conclusions. It assumes, and very properly emphasizes, the fact not generally acknowledged, that the forests on the public domain do not belong to the public-land states, nor do they belong to any one section; moreover, they do not belong to any class—that is, they do not belong to foreign shepherders, who drive their flocks wherever there is a blade of grass or a tender shoot of shrub or tree; they do not belong to prospectors or miners; they do not belong to lumbermen. They are a part of the national heritage, and they are the property of the whole country, of the east as well as the west, and their destruction would mean the paralysis of all our industries and would strike a blow at the agriculture and commerce of the entire land. It is the duty, therefore, of the national legislature to take measures for protecting them. No one's rights are invaded when shepherders are prevented from exterminating the forests, and prospectors are punished for firing forests, either willfully or carelessly, because the entire community is interested in them. How much this great national resource suffers from nomadic sheep husbandry the report sets forth in vivid language. It is shown that these "hoofed locusts" not only render permanent forests impossible by the obliteration of all young growth, but they increase the number of fires, because the herders, after destroying every green thing, even on the most inaccessible slopes of high mountains, set fire to the dry rubbish in autumn when they descend to the plains to stimulate the growth of herbage for another year. And fires in the dry western forests, kindled by careless or ignorant prospectors or herders, have wrought devastation that no one can appreciate without a personal examination. There are no statistics to show how great is the area of timber burned up every year, but the committee report that while traveling for six weeks through northern Montana, Idaho and Washington and Oregon they were constantly enveloped in the smoke of forest fires. Of course, the country suffers enormous loss this way, because these conflagrations once under way among coniferous trees are never stopped until they are put out by a heavy rainfall or encounter a large river. No human agency can check one of these fires after it has begun to run, and the only hope of saving the woods from destruction is by preventing them or extinguishing them at the beginning.

And this leads to the second important proposition of the report, which is that any attempts to protect the forest either from pillage or from the ravages of flocks or of fire have always failed under the ordinary political agencies of the Interior Department. A constantly shifting service with no esprit de corps, no opportunity for promotion, no permanence of tenure, selected as it usually is on the recommendation of men who are in sympathy with those who prey upon the woods rather than with those who wish to protect them, has never shown any efficiency, and, of course, it never will. On the other hand, the experience gained in managing the national parks proves that they can be protected from pillage and from fire, even in the wildest portions of the public domain, by a small body of troops. As a temporary protection, therefore, against depredation and loss, the army, and the army alone, will prove efficient. The committee therefore recommends that each important reserve should be placed at once in charge of an officer of the army, detailed during the season when forest fires are to be dreaded, to report to the Secretary of the Interior and act as superintendent, and that he should be supported by sufficient details of soldiers. Of course, this is not to bring in a revenue, nor yet to establish a system

of forestry; it is simply to save the woods from the lawless depredations of men and animals and the terrible dangers by fire.

But this is only a temporary expedient to bridge over the time until there can be a permanent organization. The management of forests requires such a wide technical knowledge, and such a sustained effort to be persisted in through generations, that success is possible only through an organization as stable as that of the army or the navy. And this seems to us the most important feature of the entire report. It is hopeless to expect that forests can be preserved, much less managed for production, under any form of civil service that now exists. A regularly organized forest bureau, consisting of officers of the highest personal character and of liberal scientific education, is needed, and men of this class cannot be had unless their tenure of office is permanent and their remuneration is liberal. As the committee point out, however, it is no unusual occurrence for a single fire to destroy in a few days material which is worth more in actual money than such a forest administration would cost in years, while the loss to the country in impaired waterflow, through forest fires which might easily be prevented by such a service, is incalculable. The expenditure, therefore, of as much as \$250,000 a year, the sum indicated by the commission as necessary to furnish means for protecting the forests on the public domain, is justified by every consideration of common sense and of economy.

We have no space to speak of the chapter on the unreserved forest lands of the public domain, or of the proposed Board of Forest Lands, which is charged with the decision of certain very important questions. We will only add that one of the bills published as an appendix to the report provides that all public lands of the United States which in the judgment of this Board are more valuable for the production of timber than for agriculture or mining shall be withdrawn from sale, settlement and other disposition, and held for the growth and sale of timber. Other bills provide that the upper slopes of Mount Ranier, with its glaciers and alpine meadows, and the marvelous Grand Cañon of the Colorado in Arizona shall be preserved without any further defacement than is necessary to make them easily accessible to the people, and that they therefore should be set aside and governed as national parks.

No one can see far into the future, but it looks as if Congress had taken effective means to postpone all attempts at the efficient protection of our forests and to prevent the adoption of the conservative measures recommended by the committee of the National Academy of Sciences.

Plan of a Country Place in Connecticut.

EVERY piece of land, especially in the older portions of our country where the forces of nature and the hand of man have been at work to mould and develop its particular features, has a character of its own. This character may be pleasing, and, if so, when the land falls under the control of the landscape-gardener it is always best for him to work in harmony with the spirit of the place so as to emphasize and bring out its special beauties rather than to struggle against nature and attempt to transform it into something essentially different. The plan on page 227 shows a design for home grounds in which the aim has been to preserve the original features and make the most of them. The property had been for years a New England farm of the better class, and little attention had been given to matters that were not strictly utilitarian. Nevertheless, there were plain advantages in its elevated situation, and the consequent breadth of view afforded, in its varied ground surface and its fine natural growth of trees in groups or isolated specimens. Altogether, these well-disposed Oaks, Ashes, Maples and Elms on the rolling surfaces give a dignified air to the place, with occasional picturesque passages, and the design has been elaborated along these lines. The aim has been to unite the scattered elements

of value and so to dispose the architectural features in relation to them as to make a harmonious effect.

The house is situated on high ground with a fine background of large trees, and plantings have been added as required to screen but not to entirely conceal the green-houses and stables and minor buildings. Since the ground falls rapidly from the back of the house to a level fifteen feet lower—a level which is maintained in the adjoining meadow-land—these accessory buildings are properly subordinated. Being on level ground they are mostly connected by straight roads. In front and at either side of the house the ground slopes gradually, the street level in front being five feet below it. The approach-drive entering with a descending grade quickly passes through masses of trees, after which a broad expanse of undulating lawn comes into view, and the bordering plantations suggest its continuance beyond by the farthestmost groups of trees. It then enters a closely planted copse from which the grade ascends continuously to the house. The house is visible on emerging from this planting, and is here seen to good advantage with fine stretches of lawn in front and on either side, with a heavy background of trees supporting groups to the left, an incidental glimpse of a little garden behind some bordering shrubbery, and views on the lower grounds to the right. Fine prospects open from the house. On one side the well-kept lawn comes close to the foundation, and the two are united by shrubs and vines; on the other is a foreground of pasture-lands with wooded hills beyond the railroad, the glittering waters of the Sound in the offing, and on clear days glimpses of Long Island in the distance. The screen which hides the railroad is of such moderate height that it will not obstruct the distant prospect. Continuing past the house the drive begins to descend, and opposite the end of the greenhouse it enters a winding valley. Following the low ground a pleasing succession of concave surfaces comes and goes until a close-growing piece of natural woods is reached. From this point to a ledge of rock near the exit is a steep hillside on the left, which ascends to the street some fifteen feet above it. The road first passes through the dense shade of overhanging trees, then skirts a small opening with the half-concealed ledge at the farther end. This ledge makes an appropriate finale to a drive which in its course has brought to view a succession of interesting scenes, all of them united in that they suggest throughout the main idea. The numerous curves suit the grounds, and there is an evident reason for every one. The plantations have been disposed so as to help the architecture where they are related to it and unite the scattered trees which originally existed, while simplicity and breadth of effect has been the aim at every point.

The material for planting has been selected with a view to preserve the quiet dignity of the place. Near the house trees like the Yellow-wood, Beech, American Hornbeam, Liquidamber, Magnolias and a few *Koelreuterias* have been selected; while further away Oaks, Chestnuts, Maples, Elms, Ashes and Lindens are used, and on the natural wood-borders Flowering Dogwood, the Judas-tree and Thorns in variety have been used, with many woodland Ferns, flowers and shrubs. Among the latter *Rhododendron maximum* has been very freely planted. Along the low ground bordering the railroad an effect such as is often seen in New England in the richer lowlands has been attempted, especially in regard to the autumn foliage, by planting Swamp Maples, Sumachs in variety, *Amelanchiers*, Cornuses, *Viburnums*, *Celastrus*, some White Birches and White Pines. In this scheme the general character of the place can be seen at once, although there are certain details of the work which can only be brought about gradually, owing to the undesirable position of some of the old trees and the lines of former roadways. Nevertheless, with the hearty coöperation of the architect and the intelligent interest of the owner, the successful development of the design seems assured.

New York.

Charles H. Lowrie.

The Flora of Ukiah Valley.

IN a former article (vol. ix., page 482) I touched upon the geological formation of Ukiah Valley, and stated that Ukiah Valley was once a lake, not in the distant past, but so recently that its extinction cannot date back more than a hundred years. Nearly all of the oblong or round valleys, common in the Coast Range north of San Francisco Bay, are also the beds of lakes. Northward of Ukiah several valleys on Eel River still contain the remnants of the lakes at the lower end. East of Ukiah lies Clear Lake, quite a large body of water, and at its north end Sule Lake is a vivid illustration of the process by which so many other lakes have been extinguished. This is a lake of considerable size, so much shoaled by deposits that tall rushes cover nearly the entire surface, and inpouring streams are rapidly filling it on the sides. Such a lake once covered Ukiah Valley. Swift-coursing streams poured from the steep mountains about and carried great quantities of debris. The prevailing formation is sandstone and shale, which rapidly disintegrates, and the slopes are so steep that erosion is rapid. Deltas of gravel or clay were formed where the streams deployed into the valley. Those formed when the lake was highest are the high bench lands about the bases of the mountains. Lower benches were formed in succession as the lake receded, and when at last the valley was drained by the combined process of filling on one hand, and the cutting down of the outlet on the other, the larger streams cut through their earlier formation, making rich vales, while the smaller streams deployed over the mud flats and carried rich deposits of mud, fine gravel and leaves to form the black gravel lands of to-day. This latter process is rapidly going on even now. At the final ending of the lake the extinction of the beaver and the burning of their dams bore no small part. Along the large streams alluvial deposits were made, gradually raising the land next them to a little above the height of the lower valley between the rivers and the benches.

In our beautiful valley each formation has its flora. The trees and shrubs on the higher benches vary according to the soil. Most of the benches were in woods, especially where the formation was a deep gravelly one. Some extensive benches were formed by the large creeks rising in the Chemise-covered mountains. These are a very deep poor gravel, and are a home for nearly all of the trees and shrubs and many of the plants characteristic of the Chemise region. More frequently, however, the uplands were clothed with a fine growth of timber, among which the Black Oak, the Post Oak (*Quercus Douglasii*), the Douglas Spruce and the Madroña predominated. There were large trees in abundance and a wealth of flowers beneath. Since I have known these uplands there has been an undergrowth of young Madroñas, both seedlings and clumps of sprouts from older stubs, of Manzanita and of Oaks. The Douglas Spruce, too, are mostly young trees. I have no doubt that previous to the settlement by the whites almost annual grass fires, set by Indians, kept this small growth down, and that the woods then were quite open. Along the river banks, and covering almost the entire alluvial deposit, was another strip of woodland which has now largely given way to orchards, Hop fields and Alfalfa. Sections still remain thickly clothed with White Oaks, *Quercus lobata*, Ash, Laurel, Willows, which are not bushes, but large trees, Box Elder and Cottonwood. Occasional Alders, brought down by the streams from their mountain home, live next the water, and nearer the hills, too, the Oregon Maple. *Clematis ligusticifolia* and wild Grapes climb to the tops of great trees. Wild Blackberries run riot over bushes, and in early summer the Big Root, *Megarrhiza Marah*, grows as luxuriantly as the famous Bean-stalk in Jack's romance, for a short while, and hangs thick with its thorny-looking fruits. Here are thickets of wild Roses, *Rosa Californica*, ten or twelve feet high. Down in the river bed the deposits of sand or gravel harbor many plants of mountain origin, which in their short existence rival their

home brethren. Some of these river beds are a rich field for the flower lover. Late in summer they have their own flora, such as the gorgeous *Mentzelia laevicaulis* with rich yellow flowers fully six inches across.

The lands lying between the alluvial belt and the first bench are low and often wet. Few trees grow on them, except scattering White Oaks. Originally they were covered by a dense growth of Grasses and wild Anise, with a multitude of flowering plants, many of them liliaceous. The rich, gravelly deposits were the favorite home of the White Oak, and before the needs of the farmer caused these to be cut they formed open woods for miles in the valley, and nearly all were large trees. In such grounds, too, the Elder is to be found, not the bush of the eastern states, but a tree a foot or more in diameter and twenty or thirty feet high.

The flowers and trees of the lower hillsides vary as the soil differs. Those facing south are oftener bare or thinly timbered, and those facing north are usually well wooded. In my article, "A Cañon near Ukiah" (vol. ix., p. 482 and p. 493), I described a prevalent form of growth. The cañons on the east side of the valley differ from those on the west, as I hope to show another time.

Ukiah, Calif.

Carl Purdy.

Foreign Correspondence.

London Letter.

ARISTOLOCHIA GOLDIEANA.—Plants of this extraordinary Birthwort have lately flowered in the stoves at Kew. It is a native of Old Calabar, where it occurs abundantly in swampy ground, the large flowers resting on the earth and impregnating the air with their fetid odor for miles around. It has been in cultivation about thirty years, but from the difficulty of inducing it to flower it has never found any favor outside botanic gardens. It differs from the popular, easily grown *Aristolochia Gigas Sturtevantii* in having a tuberous root-stock, annual stems, and in the flowers developing on the base of the young growth before the leaves have appeared. During winter the plants should be kept quite dry, and in March they should be saturated with water and placed in the hottest, moistest, sunniest position in the stove. The flowers are twenty-six inches long, a foot in diameter, three-lobed and colored chocolate-red with yellow mottlings.

SOLANUM WENDLANDII.—This plant is again magnificent in the Water-lily house at Kew, where it festoons a portion of the roof with its straggling stems, bearing enormous clusters of bright purple-blue flowers. Nothing could be handsomer in the way of a roof-climber for the stove, and no plant gives less trouble to the cultivator when once its requirements are understood. For years it was grown in a pot among the Succulents at Kew, treatment which kept it alive, but never induced it to flower. It was then planted in a shallow border in the porch of the Water-lily house and the shoots trained along the girders of the roof. The bright sunshine and fresh air which it here obtained suited it, and it has flowered freely and continuously every year since. During winter it is kept quite dry when all the leaves fall off. In February it is pruned to short spurs; the roots are then well soaked with water and top-dressed with manure. These details may help those cultivators who have tried and failed with this grand plant.

UTRICULARIA FORGETIANA.—This is the name given by Messrs. F. Sander & Co. to an exceptionally strong-growing, large-flowered variety of the Brazilian *Utricularia longifolia*, which they have recently imported and which has flowered freely this spring in their nursery. The stems creep as in the well-known *U. montana*, and from them spring numerous linear lanceolate wavy leaves about a foot long. The flower-spikes are erect, two feet or more high, each bearing from twelve to twenty flowers, which are two inches across and of a rich violet-blue color with a blotch of orange-yellow on the boss-like cushion at the base of the lip. The flowers last about a week, and Messrs. Sander & Co. have had plants continuously in bloom for

over two months. The introduction of this and other giant *Utricularias* from South America is very creditable to the St. Albans firm, for they are plants of greater interest to botanists than to horticulturists, the latter finding them difficult to manage. From what I hear *U. Forgetiana* is as easily grown as *U. montana*.

BOWENIA SPECTABILIS.—Hitherto this remarkable Cycad has found no favor with the ordinary cultivator, but Messrs. Sander & Co. have succeeded in raising a large number of seedlings of it, and these reveal the merits of the plant for purposes of decoration. The root-stock is a fleshy tuber from which rise numerous decompound leaves resembling the fronds of a gigantic *Adiantum*. Large plants produce leaves a yard in diameter, and as the leaflets are elegant in form and of a rich glossy green color they are decidedly ornamental. Small plants have leaves of various sizes, and are especially adapted for vases, drawing-rooms and all purposes of ornamentation, the uncommon structure of the fronds—indeed, one may say of the whole plant—being of a character likely to excite interest as well as admiration. The plant is monotypic and is a native of Queensland.

PHAJUS CALLOSUS.—An importation of this Orchid was sold at the auction-rooms this week by Messrs. F. Sander & Co., who collected the plants in Perak. It is very similar to *Phajus Wallichii*, but is easily distinguished from that species by its more oblong sepals and the broad ends of the petals, while the lip has a tubular limb and short midlobe, the spur being short and incurved. Their color is dull reddish brown, the lip yellowish white, tinged with pink, bright red toward the apex. The color of the flowers varies considerably with age. A plant of this species flowered in the Kew collection last year, but it is rare in cultivation. It is a native of Java as well as the Straits Settlements. *P. Mishmensis*, from the Mishmi Hills, in Upper Assam, a species with rose-colored flowers, is worth the attention of collectors. It flowered recently at Kew, and a figure of it was published in *The Botanical Magazine*, t. 7479.

OXALIS ENNEAPHYLLA.—This is a most distinct and charming species of *Oxalis* which is hardy at Kew, where some plants of it are now flowering freely in a shady nook in the rock garden; there are also about a dozen pots of it in flower in the alpine house. It has fleshy thinly ovate bulbs an inch long, and tufts of short-stalked leaves which are very glaucous, and the blade is divided into from nine to twelve linear, overlapping pinnæ. The flowers are among the largest in the genus, being over an inch in diameter, the petals of solid substance and pure white. It is a native of the Falkland Islands, whence it was first introduced by the late Professor Moseby during the Challenger Expedition in 1876. The large batch of plants now in flower at Kew were collected in the Falklands by Mr. Linney, the Governor's gardener, formerly employed at Kew. It is there known as "White Lady." This is the only species of *Oxalis* known to me that requires a shady position.

CAMPANULA PERSICIFOLIA.—Some of the varieties of this handsome *Campanula* are most useful for pot-culture for the conservatory. They force freely; indeed, with good cultivation and the application of a little heat, they produce finer flowers than when grown in a border out-of-doors. The best of them all is one called *Alba grandiflora*, of which there are now numerous examples in the conservatory at Kew. They are two feet high, clothed with large bells two inches in diameter and of the purest snow-white; they have been in flower since the beginning of May. These plants are grown in pots in the open air all summer and wintered in a cold frame. In February they are placed in a sunny greenhouse along with Zonal *Pelargoniums*, where they soon push up their flower-stems. The varieties come true from seeds. There are other white-flowered forms, but that here named is the largest and best of those tried at Kew.

PELARGONIUMS—I do not gather from W. S. A.'s interesting paper on *Pelargoniums* at Cornell University (page 184)

that he is acquainted with Sweets' *Geraniaceæ*, which contains excellent colored pictures and descriptions of hundreds of *Pelargoniums*—species, hybrids and seedlings. The efforts of modern breeders of these plants are limited to the three races—Zonal, Show and Ivy-leaved—but any one familiar with the species of *Pelargonium* found in south Africa will know how great is the variety and how interesting the characteristics of many of them. There is a fairly comprehensive collection of these species in cultivation at Kew, where their peculiarities are a source of interest to visitors who know the ordinary types, but are fain to believe that they have any close relationship with these "queer-looking" and, in some cases, distinctly pretty plants. We owe many of these to Philip Masson, who collected for Kew in south Africa a hundred and twenty years ago.

London.

W. Watson.

Entomological.

The Pistol-Case-Bearer.

THE interesting insect which is shown in the accompanying illustrations is evidently becoming one of the serious insect enemies of the Apple orchards in this state. Last year we received many complaints from prominent fruit growers from various sections of the state, and especially from those residing in the more important apple-growing counties of western New York. Judging from letters received and from our own observations, there are as many or more of the case-bearers this year than last. Some of the large orchards near Geneva are badly infested, while many of those about Rochester and westward, in the vicinity of Albion and Lockport, appear to be even more seriously attacked. The nature of the insect is indicated in the illustrations. It is one of the case-bearing species, and as the case which each caterpillar constructs slightly resembles an old-fashioned pistol in shape, it is commonly known as the pistol-case-bearer. Its scientific name is *Coleophora malivorella*. It was so named in 1878 by Dr. Riley, who published a technical description of the male and female moths in the Report of the United States Department of Agriculture for that year.

The case is for the protection of the insect while in the larva and pupa stages. During the winter the cases may be found attached in a nearly upright position on the bark



Fig. 28.—Young Pistol-case-bearer, natural size, on an Apple leaf-bud.

of the smaller twigs, and usually near or even upon the buds. They measure on an average about an eighth of an inch in length. With the first warm days of spring the little case-bearers become active and make at once for the nearest buds, carrying, as it appears, their odd-looking cases on their backs. They bore into the swelling buds to

feed on the tender tissues. Fig. 1 is from a photograph made April 24th, showing a pistol-case-bearer, of natural size, at work on an opening Apple-leaf bud. After the photograph was made the case-bearer was removed, showing a small round hole just large enough to admit the insect's

the leaves have become well expanded the case-bearers attack these also, eating away the soft parts at first, but finally eating holes clear through them. Later in the season, when they have become larger and stronger, they readily devour nearly the whole leaf with the exception of the midrib and larger veins.

Although the case-bearers do serious injury in thus feeding on the leaves, they probably do as much or more harm by attacking the opening flower-buds and the fully expanded flowers themselves. They feed on the interior of the flower-buds, eating away the tender tissues, destroying the life of the buds and thus preventing the development of the fruit. In the same way the flowers are destroyed, both the petals and essential organs being devoured. The fruit is also sometimes attacked, the case-bearers boring through the skin and feeding on the tissues just beneath. This causes the apple to become more or less deformed, according to the extent of the injury. Young pears also suffer in this way.

During the middle or latter part of May the case-bearers are ready to pupate, and accordingly migrate to the twigs, where each larva attaches its case firmly and in a nearly upright position to the bark. They then manage to turn around in their cases so as to bring the head in the opposite direction from its original one. While in this position the change to the pupa takes place. About the middle of June the mature insects, small gray moths, come forth, making their exit by means of a slit in the upper end of the case. Egg-laying soon begins, the eggs being deposited on the under side of the leaves. As soon as hatched, the young case-bearers begin to construct their cases, making them of excrement and silk, and begin to eat small round holes into the interior of the leaf. Before winter sets in they migrate to the twigs, where their cases are firmly attached to the bark in a nearly upright position, to remain until spring comes again.

This is in brief the life-history of this interesting insect. We have discussed it more in detail in Bulletin No. 122 of this station. Although apparently so well protected, many of the case-bearers succumb to the attacks of parasites. We have bred three species from insects kept in the laboratory.

As to remedial measures, theoretically the case-bearers can be controlled by spraying the trees with Paris green just before the leaf-buds begin to swell, so that the first meal of the newly awakened insect will be a poisoned one. Our experiments last year showed that an application of Paris green made at this time, using one pound to 150 gallons of water, aided materially in holding the pest in check.

Two applications of the poison were made later in the season, however, one just as the young case-bearers were observed eating holes clear through the leaves, and another soon after the petals had fallen. These three applications proved successful in keeping a number of Apple-trees which had been badly infested comparatively free.

Although apparently preferring the Apple, this case-bearer attacks the Pear and Quince.

A closely allied species is the cigar-case-bearer, which has many similar habits, but which can be readily distinguished from the shape of its case.

New York Agric'l Exptl Station, Geneva, N. Y.

V. H. Lowe.

Cultural Department.

Choice Hardy Plants.

IN a slightly shaded, cool, moist and sheltered position a bed of *Gentiana acaulis* is now freely showing its beautiful flowers. The bright dark blue flowers are large, considering the size of the plants. They are campanulate, but not droop-



Fig. 29.—Young Pistol-case-bearer on opening leaf-bud of an Apple, enlarged nearly five decimeters.

body. This hole reached well toward the interior of the bud, where a cavity was evidently being made in consequence of the devouring little insect's appetite. While feeding in this way the caterpillar did not lose hold of its protecting case, but apparently held it in position by the posterior segments of its body. It does not appear to be the habit of the caterpillar to leave its case, but to thrust its body out as far as possible without losing hold of this protecting retreat.

Fig. 2 is from a photograph made April 29th and shows the insect enlarged about four times. It will be noticed that the case is not quite the same shape as the one shown in Fig. 1. As the case-bearers enlarge they change the shape of their cases slightly, and also lengthen them as the increasing size of their bodies demands. When of full size they measure about one-fourth of an inch in length. The twig in the figure was cut from a three-year-old Apple-tree in the nursery row. The case-bearer was working on the interior of the bud at the base of the opening leaves. When

ing, two inches long, and are borne singly on upright stems three or four inches high. This choice alpine plant is quite noticeable, even when not in blossom, on account of its bright green shining leaves which nestle close to the ground in rosettes. A deep light loam with a bit of limestone will suit this plant.

Primula Japonica is a desirable plant for the rock garden, and it is not generally known that it will withstand the most severe winters here. It will even ripen seeds freely, and if these are not collected they are scattered about the old plants, where they germinate and become healthy seedlings. Here *P. Japonica* thrives in a slightly damp, deep, rich soil, and is now throwing up flower-stems to a height of a foot and a half. The crimson flowers are produced in whorls along the stems, and as they do not all open at the same time, the flowering season is much lengthened. My experience with the seeds is that they germinate about a year from the time of sowing.

Another Japanese Primrose blossoming now is the lovely *Primula Sieboldii*, one of the most floriferous and showy of all the Primroses. We have extra-strong healthy plants, which keep on increasing every year. The flowers, an inch and a half in diameter, are produced in umbels of eight or ten on stems about a foot long. This deciduous species, if grown in a warm sheltered place and covered over with leaves in winter, proves quite hardy. A slightly moist, rich, loose soil suits the plants here, and in a somewhat shaded place the flowers last longer.

For the front row of the mixed border, or for slightly elevated parts of the rock garden, *Aster alpinus* is deserving of notice at this time. It is an attractive species with a dwarf, stout habit, and grows vigorously here. The bright purple flower-heads are produced singly on stout stems which rise six or nine inches, and they measure two inches in diameter. This *Aster* can be increased easily by division and is readily raised from seed.

The native leguminous plant, *Thermopsis mollis*, should be in all gardens, and is an excellent perennial for the border. It has a stout, bushy habit and needs no staking to keep it in position. It flourishes in deep rich soil in an open position. This plant is about three feet high and its stems have palmately three-foliate leaves. The flowers are yellow and are borne in long terminal racemes, which last in good condition for a considerable length of time. The seeds are sometimes slow to germinate, and show no sign for more than a year after they are sown.

The horned Pansy, *Viola cornuta*, is valuable for its continuous blooming qualities. In a cool, shaded spot it flowers all summer. The flowers are pale blue and of good size. A variety of this species, *Perfection*, is a desirable plant, having a dwarf habit and abundant blue flowers as large as an ordinary-sized Pansy. *Violas* are easily grown and flower profusely during the hot weather and deserve a prominent place in our borders.

Calamintha alpina, a hardy plant from the south of Europe, is one mass of small blue labiate flowers. It is a valuable plant for the rock garden, and also grows freely in any ordinary good garden soil. It is a low-tufted plant, about six inches in height.

The large patches of *Stellaria holostea* are now out of blossom, and in the borders the *Cerastiums* are the most prominent low-growing plants, with white flowers. *C. arvense grandiflorum* is remarkably good, with large white flowers. *C. Boissieri* is a distinct species, with silvery foliage and medium-sized white flowers. It is quite hardy here and grows vigorously, while *C. tomentosum*, another species with silvery leaves, does not stand the winter well with us. Other species in bloom now are *C. oblongifolium*, *C. arvense*, *C. dichotomum* and *C. alpinum Fischerianum*. The double form of the rich yellow-flowered *Ranunculus acris*, commonly called Bachelor's Buttons, is a profuse bloomer in a slightly damp and cool place.

In the rock garden *Silene alpestris* has proved quite hardy and is a choice plant for a slightly elevated position. It has panicles of pleasing white shining flowers and a dwarf compact habit. This native of the Austrian Alps was introduced more than a century ago. Another choice species with much the same habit and requiring the same treatment and situation is *S. quadrifida*. *Saponaria ocyroides* is valuable for the drier parts of the rock garden and the front row of a dry sunny border. The prostrate stems of this beautiful trailing plant are almost hidden by its rosy flowers.

The European *Salvia pratensis* is the first species of this large and showy genus to blossom. It makes a good border plant, and its long, graceful racemes of blue flowers are conspicuous now. In the front row of the mixed border patches

of *Veronica rupestris* are decorative. The flowers are pleasing and produced in great abundance. *V. paniculata* is slightly taller than *V. rupestris* and has larger panicles of flowers. Other choice species now blossoming, and all easily cultivated, either in the border or rock garden, are *V. Austriacum*, *V. Tencrimum* and *V. gentianoides*.

Harvard Botanic Garden, Cambridge, Mass.

Robert Cameron.

May Irises.

IRIS BOSNIACÆ, as suggested by Herr Leichtlin last week, is a handsome dwarf species, and it has been described in GARDEN AND FOREST. But the leading idea in these Iris notes has been to call attention only to those which have proved reliable in my garden and are presumably those best adapted to general cultivation. *I. Bosniacæ* has dwindled away twice here, and for this reason was omitted. To my taste *I. cristata*, which was inadvertently overlooked, is the choicest dwarf species of the family. It is very dwarf, indeed, and has beautiful light lavender flowers with fine markings, and generally thrives in the border without special care. Another bright Iris of May is *I. Hookeri*, the Canadian common species, which has very small standards and very bright purple-blue flowers and leaves an inch broad. The Iris of the middle west, *I. Missouriensis*, is also a very gracefully habited plant with linear leaves and small blue-purple flowers of a medium shade, but it scarcely flowers as freely as *I. Sibirica*, nor are its stems as tall. The two best forms of *I. Sibirica* are *I. Sibirica flexulosa*, with white flowers, and *I. Sibirica hæmatophylla* (or *sanguinæa*, from the reddish young leaves and spathes). The latter form is often sold as *I. orientalis*, but this name is properly applied to *I. ochroleuca*, which will be noted among the June Irises. *I. orientalis* is one of the species which are usually sent out incorrectly by dealers. *I. Sibirica* is very common in eastern Asia, and as it seeds freely is often sent home by travelers with provisional names which stick to it.

No collection of May Irises would be complete without two noble plants, *I. pseudacorus* and *I. pallida*, var. *Dalmatica*. The former is a tall-growing kind, thrives well in the border, but is especially attractive in wet places on margins of streams or ponds. The yellow flowers vary in different forms, from yellow to cream color. The Dalmatian Iris is a stately plant which should be isolated where its distinction may be noted. It has very broad short leaves, and the large light purple flowers are carried well above these on tall stems. It is very fragrant with an Elder-like odor.

Elizabeth, N. J.

J. N. Gerard.

Notes from the Arnold Arboretum.

SO numerous are the desirable trees and shrubs in bloom in this well-kept and orderly department of the park system of Boston that it is impossible to give even a list of them. By systematic care, a perfect record and up-to-date nomenclature, this institution is becoming of inestimable value, not alone to Boston, but to the whole country. As soon as established plants are available, representatives of every genus of cultivated shrubs and trees—often by many species and varieties—are planted in order, which is a great convenience to those who desire to study them, for one's interest is certainly increased by the assurance that they are all properly classified and named.

During a visit made a month ago, a thousand or more seedlings of *Azalea Indica*, var. *Kämpferi*, were in full bloom. These have stood two winters unprotected, and there is no reason why they should not be accounted hardy. These seedlings were part of a lot of ten thousand raised by Jackson Dawson from seeds gathered by Professor Sargent in Japan, and consignments have been made to all the best gardens of England and the continent of Europe. Their earliness is remarkable; they flower ten days before *Azalea mollis*, and more than two weeks earlier than the Ghent *Azaleas*. The *Indica* type are mostly in colors of warm red, orange-red and reddish pink. The markings of the standard petal show their affinity clearly. Here is an opportunity, which undoubtedly will be taken advantage of, to hybridize these with other species and varieties.

The Japan Quince was at its best at the time of my visit, and represented by many peculiarities in habit of growth and color of flower. Some are upright, others prostrate, and the salmon-tinted and white-flowered were exceedingly effective. The Crab-apples, a study of themselves, are seen in several types, which merge into one another. Those of upright habit, with larger leaves, flowers and fruit, known as the *Baccata* group, resemble more nearly our cultivated Apple. The

Toringa and Spectabilis groups we would recognize anywhere as Crab-apples, being more diffuse in habit and exceedingly floriferous. At a later visit I found all the Crab-apples, with the exception of a few American species, past, and of these *Prunus coronaria* is the most noteworthy. It is a tree worth a place in any garden; it is handsome in foliage, and in flower fragrant as a Tea Rose.

The European Lilacs are about past, and a long bank of these in bloom together makes a gorgeous show. Although grouped for comparison rather than effect, the average visitor considers them only from the latter standpoint; and while the landscape-artist may object to such planting, it is invaluable for study and comparison. Among the best varieties I noted *Alba grandiflora*, white; *Dr. Regel*, lavender; *Lagraye*, white; *Virginite*, double blue, fading to white, the most admired in the group; *Massart*, purple; *Notger*, bluish; *Leon Simon*, double light blue; *Lemoine's* new hybrid, *Lewis Henry*, has very large blue flowers, in size covering a silver quarter dollar by actual trial. *Concordat* has the largest panicle of any in the group, measuring fourteen inches in length and breadth. The

free; *L. media*, dwarf and graceful; *L. vulgare*, the common European Privet, stiff and with dark leaves. This is a common hedge plant in the Old World, but is not nearly as handsome as the Californian *L. ovalifolium*, where this will succeed.

Cotoneaster reflexa is very free-flowering. It was a sheet of white and strikingly beautiful. *Caragana arborescens*, the Siberian Pea Tree, is a beautiful shrub or small tree which should be better known. In habit it suggests *Cassia marilandica*, with showy yellow pea-like flowers. There are several kinds, and a weeping form, *C. grandiflora*, is the handsomest.

Shrubby *Spiræas* were plentifully in bloom. *S. arguta*, new, is intermediate in habit and time of blooming between *S. Thunbergii* and *S. Van Houttei*. It makes a handsome bush. *S. pubescens*, from China, is another distinct kind. *S. rotundifolia* is valuable on account of its lateness. *C. cana savranica* has a neat feathery habit. A selection of *Barberries* includes *Berberis Cretica*, with glaucous foliage, an exceedingly dwarf form of *B. Thunbergii*, *B. heteropoda*, fine foliage and large flowers, and some good forms of *B. vulgaris*.

Wellealey, Mass.

T. D. Hatfield.



more distinct Japanese and Chinese species and varieties will not be open until well into June. Of the group, *L. villosa*, purple, fading to white, and very handsome, is the earliest, and is just opening. A noble specimen of the Tree Lilac, *Syringa Japonica*, already nearly thirty feet high, will be worth a visit when it is covered by hundreds of diffuse panicles of creamy white flowers. *L. Pekinensis* also forms a graceful tree.

The Bush Honeysuckles afford much variety. *Lonicera Tartarica* is represented by several forms which differ mostly in the color of their flowers; these vary from creamy white to pure white and clear pink. There are, besides, several distinct species well worthy of cultivation. *L. Morrowi* is a neat bush with gracefully recurring branches clothed with a mass of blush-white flowers. *L. Alberti* has pink flowers and is of prostrate habit; *L. savranica* makes a neat bush. *L. alpigena* has red flowers, and the pretty *L. minutiflora* white and pink flowers.

The Privets form an interesting group, and when in bloom, a week from now, will be a sheet of fragrant white flowers. *Ligustrum Iboia*, a Japan species, is loose-habited and

Native Water-lilies.

NYMPHÆA ODORATA, the well-known fragrant Pond Lily of North America, and *N. tuberosa* are the only two *Nymphæas* indigenous to the United States east of the Mississippi, as given by Professor Asa Gray. Of the first species there are many forms, which vary in size and color, and of the latter there are varieties with white and pinkish flowers which range from white to bright pink-red, while in size they range from five inches in diameter downward, according to soil and location. Since the introduction of *Nymphæas* into the flower garden they have become very popular, and many new forms, by hybrids and sports, have been introduced in such variety that no water garden is complete without them. The following list of varieties will show the truth of this statement: *Nymphæa odorata*, white, sweet-scented, large; variety *Caroliniana*, rosy pink, shaded salmon, larger than the type; *Exquisite*, rosy carmine; *Union*, white and small; *Rosea*, the well-known Cape Cod pink Pond Lily, larger than the type; *Rosacæa*, salmon-pink; *Sulphurea*, hybrid, yellow. The

variety sent out as *Gigantea* is a misnomer and does not belong to this species, and the same is true of *Maxima*. The mistake was, doubtless, accidental, but it is vexatious to find valuable varieties disseminated under a wrong name or not in their right class.

Nymphæa reniformis, syn. *tuberosa*, is a vigorous species, with leaves prominently ribbed, root-stock bearing numerous, often compound, tubers, which spontaneously detach; the flowers are white, never pinkish, from four and a half to nine inches in diameter, slightly fragrant, indigenous to lakes and slow rivers in western New York, and near Meadville, Pennsylvania, to Michigan, eastern Nebraska, and probably to the southern states.

Nymphæa tuberosa—the true species—should never be planted in a pond with other choice, hardy *Nymphæas*. It is a rampant grower, produces seeds very freely, besides multiplying prodigiously from the small tubers, and when established its massive leaves stand out above the water, shading and smothering out all other *Nymphæa* growth. Since its introduction into ponds where other varieties were grown the flowers have been cross-fertilized, and numerous forms and gradations are to be met with. Several of these have value as decorative plants and bid fair to equal the *Odorata* type, if not to surpass it in gradations of size and color. With this I send two varieties of the species. The pink-flowered variety received a certificate of merit from the Massachusetts Horticultural Society three years ago, and was disseminated by me under the name of *N. tuberosa rosea*. The large white-flowered variety originated in Ohio, or is known there as *N. tuberosa*, but it is so entirely distinct that I suggest for it the varietal name of *plena*, to distinguish it from other forms. From the same source I received a variety under the name of *N. odorata superba*, but after careful cultivation I find it to be the true *N. tuberosa*. Another form received under the name of *N. superba* has all the characteristic points of the same species. Yet another variety from the rice fields of Carolina, under the name of *N. odorata gigantea*, was grown alongside of *N. tuberosa*, and no distinction between the two was noticeable. Numerous shades of pink have been noticed in the flowers of *N. tuberosa*, but the variety *Rosea* is thus far the best. All are early-flowering and desirable for special purposes. The greatest confusion exists through the introduction of the many forms of these two species without any proper classification, and it is to be hoped that some botanical society will take the matter up.

Riverton, N. J.

William Tricker.

[The pink flowers sent to this office were of a singularly delicate shade of color, and the white ones were very large and double.—Ed.]

Lathyrus rotundifolius.—This seems to be the earliest-flowering of the hardy Peas, beginning to bloom in early May. At this time it has stems six feet long, bearing a profusion of flowers of a deep rosy red color, known sometimes as old rose. This Pea is also known as *Lathyrus Drummondii*, and is highly valued wherever grown, for, next to the white-flowered form of *L. latifolius*, it is probably the most generally satisfactory hardy Pea in cultivation, as the color is a pure tone, which contrasts most pleasingly with the light green leaves. It is perfectly hardy and may be increased from seed or by division.

Cypripedium parviflorum.—This Lady's-slipper seems to be less particular as to soil and cultivation than the other hardy *Cypripediums*. It thrives here and increases under conditions which suit *Lily-of-the-valley*. It is slightly shaded by a deciduous tree and in soil rather inclined to stiffness.

Elizabeth, N. J.

J. N. G.

Physalis Franchetti.—To those who tried this fine new species last summer it was a disappointment. It was regarded as a pot-plant, and at first even seemed an annual. Late in summer it seemed that stolons were being formed for the next year's display, and we left outdoors those that had been planted out to see if they would prove hardy. These plants are now growing freely in the open border. It is evidently a good hardy perennial in habit, and by no means fitted for pot-culture, for the plants that were carried over winter in pots have not been as satisfactory as the ones in the border. This plant has been extensively advertised as the new Chinese Lantern-plant. It was one of the discoveries of Mr. James Veitch during his visit to Japan, or, at least, to him we are indebted for living plants.

Cypripedium bellatulum.—Some notes of this beautiful *Cypripede* were published recently in these columns, more espe-

cially as to its culture, and it is not necessary now to say more on this point. A specimen recently exhibited before the Massachusetts Horticultural Society deserves special mention, both for its beauty and its high culture. This plant bore ten fully expanded flowers of large size, the pot being comparatively small for the number of flowers. It was thought deserving of the silver medal of the society. Mr. James E. Rothwell, of Brookline, who is the possessor of this plant, has many fine specimens of this species. One is gigantic in habit of growth and size of flower, the leaves being nearly a foot long and very broad. Another variety is unique in that the spots are in distinct lines through the middle of each segment of the flower. It is a pleasure to find the requirements of these plants so well understood, and they are only one of the remarkable examples of high culture to be seen in this interesting collection which promises soon to become famous. I was pleased to see here a fine specimen of the pure white variety of *C. bellatulum*. This is the easiest to grow, perhaps, of all its kindred. The leaves themselves are devoid of all purple markings, and it is a very rare plant. Only one, so far as we can learn, has been introduced, but owing to its easy culture it should not long remain unattainable.

South Lancaster, Mass.

E. O. Orpel.

The Protection of Roses in Winter.—Mr. Bradley's notes on Protecting Roses in Winter (see page 209) are well worthy of attention. Almost every one who has had the care of plants in winter knows that darkness or shade is half the battle in their preservation. I have seen such plants as *Pittosporums*, *Oranges*, *Lemons*, *Hydrangea hortensia* and *Figs* pass through a winter safely in an open shed, free from sunlight. Last winter, when placing some *Arbor-vitæ* branches about a *Magnolia grandiflora*, I left one branch on the northern side outside the covering purposely, to see what the effect would be. But little sun reached it late in the afternoon. It came through until spring with trifling damage, the leaves being slightly browned here and there, but no more than those inside the *Arbor-vitæ* covering. Shade from the sun is what partly tender plants want in winter.

Germantown, Pa.

Joseph Meehan.

Correspondence.

Nurseries at South Orange, New Jersey.

To the Editor of GARDEN AND FOREST:

Sir,—Mr. W. A. Manda, who bought a few acres of wild land in the beautiful Orange Valley, at South Orange Station, only two years ago, in so short a time has brought order out of chaos, and in this "Universal Horticultural Establishment" has a large representation of most of the good things in cultivation, and a great many valuable and novel plants not often seen. As South Orange happens to be within my cycling circuit my visits here are frequent, and to me one of the most striking characteristics of the place is the rapid change, as different plants and features of interest succeed each other. Last fall, I remember, there were five thousand or more fine seedling *Araucarias*, which is not an ordinary sight. Later the frames were filled with Roman *Hyacinths*, frozen up for Easter, and last week tiny *Heaths*, which seem to strike here as readily as *Geraniums*, could be counted by the thousand. But Mr. Manda's special pride was spring-flowering *Lælias*, *L. elegans* and *L. purpurea*, of which he claims to possess the best collection in the country. Certainly there was a wonderful variety of coloring among the three hundred plants, and they were in fine vigor and of all sizes, from those with a single break to one with a dozen or more, bearing sixty-six noble flowers, richly colored, and including probably all the rare kinds which appeal, aside from any beauty, to collectors. Mr. Manda has been fortunate in his houses, for *Orchids* of all sorts grow thriftily there, as I have before taken occasion to note, and there seems to be a rapidly increasing assortment of these valuable plants. Last year Mr. Manda discarded benches in his main Palm-house with a gratifying effect, and the plants set out seem much more vigorous. In the outdoor nursery there was, as usual, a large assortment of seasonable hardy plants in flower, with a great breadth of *Pæonies* just showing color. One of the most striking novelties is a variegated form of *Lilium longiflorum*. This has a distinct white margin on each leaf and is otherwise like the type in hardness and flower. Mr. Manda is an admirer of Japanese plants, and is at work on a Japanese garden—probably without the stones and sentiment. He certainly has managed to get together, besides a great lot of Tree *Pæonies*, *Irises*, *Maples*, etc., a curious and interesting collection of odd things, ranging from Ferns to Oaks. There is also a wonderful collection of varie-

gated plants, mostly of a shrubby character, which will interest those who care to punctuate their gardens. The gem of the Japanese collection is a white form of the short-clustered *Wistaria*, *W. brachybotrys alba*, which is probably new to cultivation here. This forms a woody stem three to five feet high, with numerous pendent branches, which, in the middle of May, are covered with short racemes of pure white flowers. It is evidently a choice shrub for the lawn or for growing in a pot for special decoration.

Elizabeth, N. J.

J. N. Gerard.

Exhibitions.

The Boston Flower Show.

OWING to the mildness of the past winter and a favorable spring, flowers of *Rhododendron* exhibited in Horticultural Hall, Boston, Massachusetts, last week, were finer than any ever seen here before. The exhibits in every instance were large, and the capacity of the hall was taxed so much that several important shipments were unopened.

The tender varieties attracted most attention. The collection of H. H. Hunnewell, Esq., was uncommonly good. Among the choice kinds were Duchess of Sutherland, rosy, with deeper color on the edge; Mrs. Jackey, blush, and spotted like a *Pelargonium*; Sir Jos. Whitworth, very dark purple, large flowers; Sigismund Kucker, red rose, dark centre; Mrs. R. G. Shaw, blush tinted, red-spotted standard; Lady Grey Edgerton, rosy, with yellow spots; Mr. H. H. Hunnewell, deep rose, with dark standard. The tender varieties from the F. B. Hayes' estate, exhibited by Mr. James Comley, included *Onslowianum*, blush, orange spots; Princess Mary of Cambridge, extra fine, rosy, with lighter centre; Lady Clarence Cathcart, warm rose, red spots; John Walters, rosy red; Duchess of Edinboro, white centre, red on the edge; Dorothy Neville, blush, dark standard.

A new variety, Mrs. Powers Wilson, exhibited by Mr. Comley, attracted much attention. The trusses were extra large, color blush, with *pelargonium*-like spots on the standard.

Mrs. B. P. Cheney had a large exhibit of fine hardy sorts. Mrs. J. L. Gardener and Dr. Weld had specially good collections. Wm. Nicholson, of Framingham, showed a splendid vase of Carnations. Mr. Clinkaberry, gardener to C. G. Roebling, Esq., Trenton, New Jersey, made a grand showing of Orchids, including many rare and beautiful varieties of *Lælia purpurata*. Among these were *Russelliana*, delicately veined with purple, and *Roeblingiana*, marbled with pink and veined. *Lælio-Cattleya*, var. C. G. Roebling, is of the *L. purpurata* type, with golden throat. *Cattleya Warneriana*, var. *lilacina*, is a lovely shade of rose with a white band at the throat. *Cypripedium Chamberlainianum* is curious as well as beautiful. There is a distinct stem with small leaves arranged distichously; the flowers occur on short stems in the axils of the leaves. Green and purple are curiously blended throughout the flower; the pouch is of a deeper purplish shade. Flowers of *Cypripedium caudatum* had tails nearly two feet long.

N. T. Kidder, Esq., had a beautiful lot of show *Pelargoniums*, which, unfortunately, for want of space, had to be arranged on the steps in poor light. Kenneth Findlayson, gardener to Dr. Weld, showed *Iris Susiana* in flower.

Wild flowers proved interesting to a larger number of people than would be expected, and the collections contained almost the entire list of the interesting wild flowers in bloom near Boston at the present time.

Recent Publications.

Flowers of Field, Hill and Swamp. By Caroline A. Creevey. Illustrated by Benjamin Lander. New York: Harper & Brothers. 1897.

This beautifully printed volume of 550 pages is another attempt to help novices to call the common plants he meets by their botanical names. That Mrs. Creevey does not always adhere to one system of nomenclature is a matter of minor importance in a book of this sort, which does not pretend to have any such high scientific purpose as to engage in one or another side of the various controversies now ranging over the proper method of naming plants. Still it is rather confusing for the student who wishes to verify his work by examining some other book to find that the names used by Mrs. Creevey are not all in any one manual. The feature in which the book is especially strong is the popular descriptions of the plants and

of their ways and habits. These show a keen observation and marked literary skill. When, for example, she characterizes Bouncing Bet as "a slovenly flower with a backyardish appearance," we are apprehensive that association may have led her to be a trifle unjust, even though the phrase is picturesque. But one more phrase justifies the whole, "the calyx bursts and the petals seem tumbling out of place." The botanical descriptions proper are not as good as the popular ones. The author is not successful in selecting the distinguishing characteristics either of species or of genera, and left to these descriptions alone the student would find small assistance in the book. The figures are much better than those usually found in similar books. They are not always drawn to bring out the marked specific qualities of a plant, but they represent with much force and spirit the general air of the plant, and they show the true artistic touch.

The novelty in the book is in its arrangement. Within a few years there have been books in which the plants have been grouped according to their structural affinities, the colors of their flowers and the times in which they bloom; while this one is an attempt to bring plants into classes according to their usual place of growth, and it is certain, as Mrs. Creevey holds in her introduction, that a classification of plants upon the natural basis of their environment, including shade, soil, moisture, etc., has certain advantages. It is really a part of botanical education to know the plants which grow near the seacoast, those which grow in bogs and marshes, on the borders of brooks, in wet meadows or dry fields, in rocky woods or open sandy soil. The environment of a plant accounts for a great many of its ways and habits, and the grouping of many plants together which are subjected to the same influences ought to lead the careful student to the discovery of many interesting facts in biology. On the other hand, this arrangement is an unfortunate one for the beginner, and this book is made exclusively for beginners. Many plants are rather cosmopolitan in their habits, and it will not be strange if the student should discover on a sandy hillside some plant which is classified in Mrs. Creevey's book as a wood plant or marsh plant because it is nearly always found there. We have in mind a spot in a rather moist meadow where the little stars of *Houstonia* bloom every spring, but this plant is grouped, and very properly so, among those which thrive in dry fields and waste places. Again, to any one who has regard for system, the tendency to group plants according to their generic and family likenesses is irresistible. It is rather disheartening to find the various species of one genus scattered all through the book, and in many cases with nothing like a generic description, or when there is an attempt at this a very meagre and unsatisfactory one. We cannot help feeling that the book would have been more useful if the plants had been arranged in the text according to their families, with one or two of Mr. Lander's fine drawings for each important genus. The central purpose of the book could then have been carried out by lists of plants arranged according to their habitat. After all, structural resemblance is the true basis of classification, interesting as classification by environment may be. It is not true, as Mrs. Creevey says, that a plant born to wet soil will not flourish on dry. Our beautiful Cardinal-flower, which, by the way, is most felicitously described by her, although always born in or near the water, will flourish in any ordinary garden soil, and so will the Marsh Mallow and the Swamp Maple. We notice a few inaccuracies of statement, as, for example, that the Golden-rod cannot be cultivated, but, as a rule, the text can be trusted as correct, and every reader will at once be attracted by the sprightliness of the style.

Notes.

The twenty-eighth season of the New York Flower and Fruit Mission is now begun, and flowers and delicacies for the sick are received on Monday and Thursday mornings of each week

at the rooms of the society. Those who have country gardens may give pleasure and refreshment to the patients in hospitals and tenements by sending flowers, fruits, vegetables, jellies, eggs and other suitable articles of food. And those who have no products of country garden or kitchen to give, and who live in the city or near-by and spend some part of the summer at home, can help the work effectively in making up the flowers into small bouquets and in distributing the gifts. It may be well to say again that the express companies carry donations for this work free of charge, and particulars as to packing, etc., may be had on application by mail to the secretary at 104 East Twentieth Street, this city.

The first Burbank plums, from Florida, are now in our markets, but so early in the season are more showy than luscious. They cost twenty-five cents a dozen. Bidwell peaches, from the same state, fully grown and ripe, cost seventy-five cents for a basket holding thirty fruits. Bright Royal Ann cherries and other choice varieties, from California, cost thirty to thirty-five cents a pound, and apricots of fair size sell for thirty cents a dozen. Cherries and strawberries are now coming from the Hudson River district of this state, and the latter can be had of good size and quality for ten cents a quart box. Large, regularly formed and deep, evenly colored strawberries, known as the Gem, from Hilton, New Jersey, cost twenty cents a quart, and a fancy variety, Mary, from the same section, sells for forty cents. These berries are of immense size, many of them seven to eight inches around, but they are flattened and lack the ideal form of the Gem. Other small fruits now fairly matured are huckleberries and blackberries, both of which sell for twenty cents a quart.

People who have been raising cucumbers for market near New York have found a great decrease in the productiveness of the later plantings, the crop of which has been used as pickles, while the early vines which produce cucumbers sold in the market have not been affected. The cause of the loss is the downy mildew, a fungous disease which does not appear to any alarming extent until late July, and then it spreads quickly over the fields. The older leaves are first attacked near the centre of the vine, and then the disease spreads outwardly. The flowers are produced, but no cucumbers set, or, if they do, they grow slowly and become misshapen and unmarketable. Insect ravages usually spread from the borders of the field inward, and the wilt disease shows a sudden drooping of the leaves. The disease in question is allied to the downy mildew of the grape, and the fungus lives upon many cucurbitaceous plants. The Bordeaux mixture, used at intervals of a week or ten days, has proved a convenient, inexpensive and a sure preventive.

One of the great obstacles in using liquids to destroy insects and fungi is the difficulty of obtaining pumps of sufficient power. Professor Maynard, in the report of the Hatch Experiment Station, asserts that a steam spraying outfit will do better and cheaper work than hand or gear machines. Of course, the manipulator must know the construction of his engine and pump and have skill to keep the parts in working order. The cost of these outfits ranges from \$200 to \$400, which is too great for the small farmer or fruit grower, but in almost every village or town the work of spraying for many persons by a single owner could be done at a less cost than if each person equipped himself with small and imperfectly working pumps. It would be more satisfactory than if the plant were owned by a number of individuals, and, of course, the steam engine, fitted with a fly-wheel, could be used not only for spraying, but for cutting wood, corn-fodder or ensilage, grinding grain, pumping water, and, in short, it might be made a source of profit in many directions.

Professor Massey writes from the Experiment Station at Raleigh, North Carolina, that he picked Snead peaches, dead ripe and soft, on the 5th of June, and no other early peach is colored yet. The Snead is larger than most of the extra-early peaches, and is a fine-looking fruit, although lacking high color. It has the usual fault of its class, and gets soft on the outside, while remaining hard and adherent within. The Greensboro Peach, which was very promising last year, will fruit at the station this year. It is not ripe, but will probably come in with the Amsden and Alexander, and it is a much larger peach. Professor Massey adds that Blackberries are going north now in quantity. Most of the growers in North Carolina adhere to the Wilson, but in many places there is the same trouble that has driven this variety out of cultivation in other places—that is, the making of double flowers. Early Harvest is fine, and has an enormous crop, but where the

Wilson does well its size will always sell it in competition with the Early Harvest for more money. He has found nothing in Blackberries better than these two. The experimental fruit plats, covering seventy-five acres at Southern Pines, are beginning to make a fine show. These are not variety tests, but a study of the effects of different combinations of plant-food on nearly absolutely barren sand.

Last week marked the largest receipts of pineapples which may be expected here this season. The first cutting of this fruit in the Bahamas is usually made between the 20th of May and the 1st of June, so that the heavy shipments from these islands and from Cuba and Florida last week amounted to many hundred thousand fruits. One schooner of ninety tons burden brought 75,000 pineapples to this port, another schooner brought 115,000, and there were besides five other schooners and as many steamers loaded with the fruit. The season practically ends early in July, although there will be smaller quantities coming from Florida during August and September. The Florida fruit has superior keeping qualities and better flavor, and can be successfully forwarded to the far western states. It comes in crates of uniform size containing twenty-four, thirty or thirty-six of the fruits, larger or smaller, and sells at wholesale to the dealer who retails it for \$2.75 to \$3.75 a crate, or at from eight to sixteen cents each. The Bahama pineapples come in bulk, and are sold at \$5.00 to \$6.00 a hundred in lots of a thousand. Those from Cuba, sixty to one hundred in a barrel, sell for \$3.50 to \$5.50 a barrel. All the fruit now coming from the Bahamas is of the kind known as Strawberry, and most of that coming from Cuba is of the same sort, only a couple of hundred barrels of the Sugar-loaf variety having arrived last week. From Florida many kinds are now received, as Queen, Red Spanish, Porto Rico, etc. The latter cost from forty to seventy-five cents apiece in large quantities. The abundance of this wholesome fruit makes low prices for the consumer, and the Bahama or Cuba product may be had for ten to fifteen cents by the retail buyer, and the higher grades and larger sizes at prices advancing to \$1.00 each.

Robert Douglas, for many years a conspicuous figure among the arboriculturists of this country, died suddenly at his home in Waukegan, Illinois, on June 2d. He was born at Gateshead, near Halifax, England, in 1813, and went to Canada in 1836. In 1838 he removed to Whitingham, Vermont, where he kept the county-inn for a short time, but in 1844 he set out for the west and drove through the then sparsely inhabited country and established his home, about thirty miles north of Chicago, on the shores of Lake Michigan, at the place which has since become the town of Waukegan. Here he resumed the trade of tailor, learned years before, but in 1848, impelled by a strong love of nature which had declared itself in his boyhood, when he lived with his parents in Fallon's nursery, near Newcastle, he established a small nursery business. A year later, when the California gold fever broke out, Mr. Douglas set out with a party of his neighbors to cross the continent. In fording the Bear River, among the Wahsatch Mountains, he lost his team, and, impatient of the slow progress of the emigrant train, with characteristic courage he set out alone and crossed the deserts of Utah and Nevada and the Sierra Nevada, on foot. He remained in California but a short time, and returned to Waukegan to take up his nursery work. He was the first man to grow forest-tree seedlings by the million, and for nearly half a century he devoted his time and skill to raising conifer and other tree seedlings. He planted large forests in many western states, and the most successful plantations of *Catalpa speciosa* in the United States were made by him near Farlington, in Kansas. His counsel has always been in demand wherever forest problems were studied in this country, as, for example, at the Leland Stanford University, in California, and George W. Vanderbilt's estate at Biltmore, North Carolina. He was one of the valued assistants of Professor Sargent in gathering data for his forest report of the Tenth Census, and many of the specimens in the Jesup collection of woods in the Museum of Natural History, in this city, were collected by him. No one in his time has devoted himself to the study of trees with greater intelligence or success, and no one has done more to increase the love for them or to encourage the planting of them in the United States. Mr. Douglas was endowed with a hardy constitution, and his faculties were in full vigor almost until the hour of his death, in his eighty-fifth year. The total lack of self-seeking in his nature, his unflinching cheerfulness and rich sense of humor, made him one of the most agreeable of companions, and the integrity and purity of his life commanded the respect and affection of all who knew him.

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Doing Too Much.

MORE than once in these pages attention has been drawn to one of the chief mistakes of those who own or design country places in America. This is the mistake of doing too much. The art of gardening design, whether practiced upon a large or a small scale, is based upon nature in a very literal sense. The painter and the sculptor must base their art upon nature in so far that they must aim to reproduce her effects. But the artist in landscape is under closer obligations than this. He cannot choose a blank canvas and reproduce any natural effect that he happens to desire. Usually the outlines and main features of his picture are already indicated by nature. And even if he finds a piece of ground which is wholly devoid of irregularities in surface and of native vegetation, the proper method of treating it is suggested by its surroundings and outlook, by the character of the exposure, the climate and the soil, and by that of the vegetation to which these have given birth upon neighboring areas.

Of course, such a case as this is more uninteresting, more discouraging than any other. Diversities of level and natural growths of trees, shrubs and flowers are highly prized by the landscape artist. They make his task more grateful, not merely because they furnish features which could not be artificially produced at once, but also because they indicate the special as well as the general character of the effect which will be appropriate upon the given site. The true artist carefully preserves nature's preliminary provisions when he begins his work, accepts them as the nucleus of his design, and adds nothing which is inharmonious and nothing which is in excess of the actual artistic requirements of the case. On the other hand, the inartistic gardener or owner does not accept nature's scheme and loyally adhere to it. He fails to see that it is a scheme—a true design, if only, perhaps, in outline and suggestion. He confuses her intentions and spoils her suggested result by disregarding the characteristics of the site in placing his buildings and paths, by adding plants which do not harmonize with the indigenous vegetation, and, in nine cases out of ten, by using far too many of them and thus creating a disorderly medley instead of a rational composition.

This is what is usually meant when one speaks of "doing too much" in the treatment of a country place. But something even worse than this is done in certain instances by the owners of American country sites—something which cannot be seen or read about without exciting the utmost surprise in the mind of any one who believes that our fellow-countrymen are possessed of the common sense which may not mean real artistic aptitude, but is absolutely essential as its basis. In certain instances nature's handiwork is altogether swept away before the gardener is asked to begin his work. This is doing too much, indeed. Of course, even on the site most beautifully furnished by nature, the artist is privileged to eliminate, no less than to add, as art may dictate. But to eliminate everything in advance of his advent is an act of vandalism and of purest folly. It is to spoil nature, and at the same time to deprive art of its chance to create beauty of any individual or effective kind.

Every one knows, for example, that the surroundings of the city of Chicago are for the most part flat and featureless, that the soil is poor and the vegetation scant and scrubby. And every one should know that it must be difficult in such localities to create country places, villa sites, or those villages of houses each surrounded by its own small grounds, which are characteristic of the suburbs of our great western towns. For some miles to the northward of Chicago the suburbs are, indeed, of a flat and monotonous character most discouraging to the artist. Even here, however, beauty of an orderly, quiet, modest kind can be secured, as is shown by the streets near the borders of Graceland Cemetery. And those who know what the site of the newer part of this cemetery was less than twenty years ago, and who have seen that it is to-day one of the most attractive rural burial grounds in America, understand the radical transformations which can be produced by an artist as intelligent and skillful as its creator, Mr. Simonds.

Nevertheless, it might be supposed that, in such a region as this, all places to which nature has actually given a degree of individuality and charm would be highly valued, and their peculiarities sedulously preserved. Such is not the case. As one drives, for example, along the lake shore between the villages near Graceland and the more distant one called Winnetka, the surface becomes more diversified and the vegetation increases in size and variety until, at Winnetka, a cross-range of hills ends on the shore in a rolling expanse of country forming bluffs from thirty to fifty feet in height at certain points. Larger trees than one finds elsewhere now abound, chiefly Cottonwoods and Oaks; narrow but steep and rugged ravines are interspersed with tracts of forest of much charm and picturesque quality; and in the more open parts thickets and clumps of beautiful shrubs cover the soil, Thorns, Crab-apples, Sumachs and Willows preponderating.

On the edge of the highest of these ridges, with a beautiful outlook over the lake, stands a house the grounds of which have been carefully treated by Mr. Simonds. He has done enough to make them fitting accompaniments for a human habitation of some dignity, yet not too much either in the way of addition or of elimination. The site for the house was chosen with his assistance, and, therefore, its foundation fits the irregularities of the spot; and the trees and shrubs which nature had planted grow up around its walls in as friendly and harmonious a manner as though man had set them out after the walls were built. The sloping ground over which one looks toward the lake still bears its natural crop of Sumachs, Thorns and Crab-apples, beautiful at all seasons, and enchanting when they are loaded with blossoms, while the turf about them has been improved. And on the entrance side of the house the approach winds under Oak-trees which long have held their station, and amid groups of native shrubs increased in number, but not altered in general character and effect by harmonious plantings. This house was built less than two years ago, but it has been so well adapted to the natural

character of its site that it looks as thoroughly at home as though it had stood for thirty years; and the peculiar charm of its surroundings springs from their peculiarly local character. Nowhere else but just here on the shore of Lake Michigan could they wear the aspect they wear to-day; and only a very ignorant eye would be willing to change their individual beauty for that of a more gardenesque or more conventional kind.

Another instance of the intelligent treatment of a peculiar site is found near Graceland, in the Saddle and Cycle Clubhouse and its grounds. The low sandy bluffs overhanging the beach have not been leveled or changed for the support of this house. It stretches itself picturesquely along the verge of two of them, the little break between being spanned by a graceful arch, which carries a connecting piazza. A natural grove of Oaks comfortably overshadows its roofs, and the native vegetation has not been disturbed by uprootings or by the addition of inharmonious plants. This house also looks as though it had grown where it stands, and its effect is both beautiful and individual, because nature's scheme has been understood and respected. But not far away runs a straight road bordered on both sides by villas, one row of them immediately facing the lake. Here we see very clearly the effects of the evil art of doing too much. The process by which many of the little places have been given an empty, conventional, unindividual, unattractive aspect is revealed by the many lots upon which no houses yet stand. Those which have not yet been "improved" are diversified in surface—not boldly, but to a degree which would afford an intelligent artist a chance to individualize each lot by the placing of the house and its paths and outbuildings. They are covered with picturesque groves of trees, wind-blown and rugged, yet for this very reason harmonizing admirably with the outlook over the beach and the wind-swept lake. And they are furthermore adorned by rich undergrowths of large shrubs and luxuriant vines. Adjacent lots, however, show the process of "improvement" which will rapidly sweep all these features away. The lots which are called ready for purchaser and builder have been carefully reduced to an absolute level; all the trees, except, perhaps, one or two of the largest, have been removed, and every trace of shrubs, flowers and natural turf has been wiped away. These lots resemble huge garden-beds prepared for the work of "bedding out." They are utterly ruined as characteristic sites in a locality to which nature had given a peculiar sort of beauty; and, swept by the cold breath of Lake Michigan, they are unfit for the production of conventional gardenesque effects. The only thing that an artist could wish to do with them would be to restore such irregularities of surface as they once displayed and to reproduce the sort of vegetation with which they once were clothed. This, of course, would be a difficult, if not an impossible, process, and would demand many years for its fulfillment. Practically, the sites are destroyed for all artistic purposes.

There are many places in this section where similar offenses against good taste are evident, and many persons who are considered intelligent and cultivated seem to think that all trees are ugly and intrusive, and all shrubs and flowers offensive weeds, unless they are counted in the gardener's list of ornamental plants. If these ideas and their expression in practice were confined to one district it would be hardly worth while to criticise them. Unfortunately, however, in one or another form they are revealed to the traveler in almost every part of our land. Many planters have never learned that to produce artistic results upon nature's canvas one must follow her suggestions and use her local materials. The evil art of doing too much afflicts the mind and eye both in indiscreet additions to nature's work and indiscreet preparatory eliminations of this work.

There is harmony in planting as there is in music. Variety and even wildness may be admitted, but discord cannot be allowed.—*Planting and Rural Ornament*. 1796.

Pinus muricata.

FOUR species of the Pine-trees of the United States grow by the sea on the Pacific coast, maintaining a foothold in the most exposed situations and tossing their sturdy branches to the gale. The first of these, *Pinus contorta*, stretches along the coast from Alaska to Mendocino County, California. This is a small tree, rarely more than thirty feet high, and on the white clay barrens of Mendocino ripening miniature cones when only a few inches in height. This tree, however, is not confined to the immediate neighborhood of the coast, but spreads inland through Alaska, British Columbia, Washington and Oregon, and, assuming various forms, ultimately passes into the Lodge Pole Pine of both slopes of the Rocky Mountains and of the high California Sierras.

From a point just north of the southern limits of the range of *Pinus contorta*, the second of these maritime Pines, *Pinus muricata*, stretches southward along the California coast, leaving several gaps, however, as far south at least as San Luis Obispo County, and reappears on the coast of Lower California.

Pinus muricata is one of the Pines which produce their leaves in pairs and is a tree usually from twenty-five to fifty feet in height, although much larger individuals may sometimes be seen, especially toward the northern limits of its range, where it grows apparently much larger than farther south. This Pine has little value economically, as the wood is too resinous and coarse-grained for any use except as fuel, and as an ornamental tree in cultivation it has little to recommend it, although on the inland side of low hills back from Tomalis Point, north of San Francisco Bay, it becomes sometimes a handsome round-topped, symmetrical tree with a dense head of dark foliage. It is chiefly interesting from the remarkable thickness of the bark, which on comparatively small trunks is sometimes five or six inches thick, a peculiarity which is well shown in our illustration on page 235 of this issue, made from a photograph for which we are indebted to Mr. J. G. Lemmon, the enthusiastic and successful student of the conifers of western North America. It is also remarkable for the persistence of its ovate oblique cones, armed with short, stout, recurved prickles, which are produced in whorls and remain on the trunk and branches sometimes for thirty or forty years, often becoming imbedded in the bark.

The third of these trees, *Pinus radiata*, or, as it is more generally known, *Pinus insignis*, is more restricted in its distribution, being confined to the region immediately adjacent to the Bay of Monterey, where it forms a narrow forest a few miles long back of the grove of Monterey Cypress on Point Pinos. It is this Pine that surrounds and shelters the hotel Del Monte at Monterey.

The fourth of these Pines, *Pinus Torreyana*, is found only on the border of the high bluff and on the sides of the ravines extending from it to the sea, north and south of Del Mar, in San Diego County, where it stretches along the coast for a distance of nearly eight miles, but nowhere penetrates inland more than a mile and a half. A single grove of this tree also grows on the east end of Santa Rosa Island, off the California coast.

Private Forestry and State Forestry.—I.

FOR years both Congress and the state legislatures throughout the country have anticipated the disastrous effects of the disappearance of the forests. But, unfortunately, as soon as the question, What is to be done? is raised, we find among the legislators as many opinions as there are members, because on account of lack of experience it is impossible to decide in advance what is the best scheme. Inaction on the ground of ignorance of the best method shows poor statesmanship. Von Moltke used to say, "To act unwisely is wiser than not to act at all," and this certainly holds good with forestry. Whatever the beginning in forestry may be—if there is only a decided

beginning all over the country—true forestry will develop and progress be made.

But what is true forestry? In Germany and France true forest management was formerly considered to be the making use of the forests without diminishing the growing stock, the quantity of wood and timber cut and removed from the various parts of the forest during a year or a period of years being kept equal to the increment over the entire forest area.*

Experience in this country as well as abroad has shown that private landowners are likely to slaughter their forests in order to gain quick returns with larger immediate profits. If the father does not act thus, his son or his grandson assuredly will. Few men are so rich as not to feel the need of ready money once in a while; and few are so constant in resolution as not to take capital out of one business in order to invest it in another, when there is a prospect of larger immediate profits. Now, it is easy enough to take capital out of a forest-clad area; but it is difficult to put it back—that is, to restore the forest growth. Rarely will a landowner enjoy so long a life as to be able to fell trees of his own planting. And even were it otherwise, few people care to invest money in a venture which will make no return for scores of years, accumulating interest in such a manner that dividends cannot be separated from the original capital—a venture which is constantly endangered by fire and lawlessness, and which constantly swallows up money in the shape of taxes. Thus, well-stocked forests owned by private individuals are sure to be cut over more rapidly than they are reproduced; and poorly stocked forests, or areas deprived of their forest covers, when owned by private individuals, will scarcely ever be improved or planted anew.

However, forests may continue to exist even in the hands of private individuals with proper laws. This is the case in Austria, Switzerland, France and Germany. In the last-named country about one-half of the forest area is owned by private individuals. A large number of the owners, however, are not allowed to dispose of their forests, the property being entailed. In these cases the family is, in fact, the owner of the forest estate, and one or more members of it, carefully watched by the eyes of the law and by the other members of the family, enjoy the benefit of using the products of the forest within the limits of its productiveness. They are not allowed to cut more than its normal growth—that is, its annual increment. It has happened repeatedly that a family has brought suit against the member in possession, charging him with overcutting the forests. History has taught that entailed forest property admits of a proper and even a conservative forest management.

Owners of woodland in the Old Country who are independent of their families, as a rule, own but small areas, on an average certainly not more than a hundred acres. On forest lands of this extent forest management to furnish annual returns is scarcely feasible, and here again human nature would lead to the ruin of the forest if not checked by strictly enforced laws. Of course, owners cannot be hindered from cutting their crops as soon as they deem them ripe for the axe; more than that, they are even allowed to remove the litter from the ground, thus exhausting gradually the productiveness of the land. But they are prevented from changing woodland into farm or pasture; they are compelled after a clear cutting to plant the area within a few years; they are obliged to share pro area in the payment of a forest guard, whose duty it is to protect the forest from theft, from fire and from damage by cattle, game and insects; and the laws of inheritance do not admit of the splitting up of woodlands into fragments smaller than, say, two acres. It goes without saying that all private owners of woodland have been and are opposed to such measures and laws. The revolution of 1848 in Baden was an outburst of this opposition. Even to-day no European legis-

lature is without an organized opposition to the heavy burden of the forest laws. The great majority of the voters, however, realize the necessity for such measures—the necessity of restraining individuals or classes with a view to the protection and benefit of the people as a whole. In short, history has proved for Europe that private forests cannot be maintained in proper condition and productiveness unless they are either entailed or administered under strict legal restraint.

In this country the principle of individual freedom will long prevent the passing of laws similar to the forest laws of Europe. Entailed forest property is still an impossibility. Thus, we might be led to believe that the American forests are hopelessly lost to true forestry, but they are not. The definition of the term "true forest management" given above, as stated, was formerly the ruling one. Since 1870, however, a bold opposition has arisen which puts the financial or economic side of forestry to the front. The economic definition reads: "True forest management is that which yields the greatest money returns." In fact, since 1870, German and French foresters have become Americanized. They have more or less abandoned the vexation of leaving large amounts of capital, bearing a low interest, invested in the production of timber trees. Generally speaking, forests should be cut at the time when their annual increment (increase of value of stumpage) no longer affords an adequate interest on the capital which the stumpage represents. The truth of this principle of forestry is leading at the present moment to a considerable reduction of the growing stock of trees in Germany, Austria, Switzerland and France. Of course, this reduction cannot be carried through at once, for that would overstock the European market with lumber. However, the forester's aim is to have that amount of capital, and that amount only, invested in the forests which will yield the highest interest on the capital invested. If, for instance, a growing stock worth \$200,000 allows of an annual net revenue of \$6,000, while with the growing stock reduced to a value of \$100,000 the yield would be \$4,000 annually, the gradual reduction would be considered advisable. The entire matter is so plain and simple that one might be at a loss to understand why this main principle of forestry was scarcely discovered before 1870, and is not yet recognized by many European foresters. It would lead me too far to explain this fact at length.

There are some considerations, however, which diminish the influence of this principle on general practice. The financial principle neglects altogether the fact of the indirect utility of the forests in their influence upon temperature, water-supply, health, etc. Neither does it take into consideration the duty of the state to provide for the timber-supply and lumber industry of the next generation. In other words, it does not hold as good with state forestry as it does with private forestry. Furthermore, the financial principle is greatly influenced by circumstances which are hardly capable of economic expression. Such are fluctuations in the value of stumpage and lumber, possible legislation affecting the customs or dealing with reforestation or forest fires, the constant decrease of interest on capital all over the world, going hand in hand with an increase in civilization, and a legion of similar considerations.

Biltmore, N. C.

C. A. Schenck.

The California Orchards.

THE fruit crop of California is again below the average, owing to frosts in some districts and to hot dry winds in others. A few valleys report larger crops than usual, and single orchards are in some cases well laden, though surrounded by others that have no fruit. The following notes are from personal observation and the reports of correspondents:

Almonds are much below the average, but in a few districts show a large crop. Apricots are generally excellent, except in Sacramento, Kern and parts of Ventura counties.

* Bulletin No. 5 of the United States Division of Forestry, entitled "What is Forestry?"

Cherries are below the average, particularly the large, light-colored varieties, such as Royal Ann. Peaches are difficult to report upon, because districts vary so greatly, but the crop is thought to be only an average one. Pears, Plums and Prunes promise a fair crop in a few places, but seem to be short in many orchards. Los Gatos, San Benito and Solano districts report the prune crop as from one-third to one-half of the average season. The pears, also, have fallen badly. In fact, it is too early to determine exactly the prospects for either pears or prunes. Apples seem to be in good condition. Walnuts are up to the average. The grape crop, so far as reported, is better than usual.

In most cases under my own observations, more injury was done by the failure of late rains and by the hot days of early April than by frosts. But in the parts of the state subject to frosts there has been much injury to deciduous fruit-trees from "sour-sap," which, as Professor Woodworth, of the University of California, recently explained, consists in the fermentation of the sap of the plant by apparently the same organisms that cause the souring of milk. Root sour-sap occurs after very wet winters, in badly drained soil, and the smaller roots rot away. Sour-sap in the trunk and branches of trees occurs when late frosts, after warm days, rupture the growing cells, so that decay organisms find entrance. One orchard association has reported the loss of a thousand large trees from this sour-sap.

Taking a general view of the fruit industry of California, as should be occasionally done so as to prevent people from making unprofitable investments, the outlook is not very encouraging except in a few limited directions. Of course, reports of large profits made by persons engaged in fruit growing still continue, but at present they should be believed only after careful judgment. The average orchardist has not made any money to speak of for three seasons past, and some of the leading men in the business have become bankrupt. Some orchards have been cut down and many have been regrafted. This is particularly true of Almonds, which have been grafted over to Prunes.

There is now a general feeling in California that the fruit industry ought not to have much, if any, expansion for several years to come. Perhaps one fruit grower in a hundred will find orchard extension profitable, but nearly all will lessen their area and specialize their products.

The wiser residents regret to see sales of colony lands at high prices to non-residents for orchards which must be planned, planted and cared for by agents or by those who sold the land. California offers many and great inducements to persons who are able to buy land, live on it, and begin work there, supporting themselves by plain, old-fashioned, mixed farming until they have learned how to specialize. And this kind of pioneering, of growing up with the country, appears needful to later contentment.

One colony in this state boasts that it has more than a hundred non-resident investors, most of whom will not see the land they own until it is covered with bearing vines and trees. For five or six years they have paid for the planting and care, hoping to find their orchards and vineyards profitable. But such tracts, managed by syndicates and associations, have never been satisfactory, even from a financial standpoint, while the poor installment-payers are without that homely attachment to trees that one has planted, and to gardens that one has created, which is really the only salvation. Thousands of acres of these alien and hireling orchards are likely to go back to pasture and wheat fields.

Niles, Calif.

Charles H. Shinn.

Foreign Correspondence.

London Letter.

THE annual exhibition of the Royal Horticultural Society was held this week in the Temple Gardens, and, notwithstanding somewhat unfavorable weather, it was an unqualified success. The exhibits were, on the whole, of superior quality to those of previous years, while

the company was greater. Her Royal Highness the Princess of Wales visited the exhibition on the opening day and expressed her delight with it.

ORCHIDS.—The collections sent by Sir Trevor Lawrence, Baron Schroeder, Mr. W. S. Ellis, and by Messrs. Sander & Co., Low & Co., B. S. Williams & Son, Cypher, Lewis & Co., Charlesworth & Co., and Messrs. Linden, of Brussels, were remarkable for their extent and excellence, both as to specimens and variety. The enormous plant of *Coelogyne Dayand*, bearing twenty-four racemes of flowers a yard long, was a feature for about the fourth time, proving that good cultivation alone, and not, as was at first suggested, imported vigor was the cause of its flowering so freely. The rare *Cypripedium callosum Sanderæ*, bearing two flowers, *Bulbophyllum barbegirum* with two spikes, *Hexisia bidentata*, a charming *Dendrobium*-like plant with scarlet flowers, *Lælio-Cattleya Digbyana-Mossiiæ*, a big specimen of that most delightful of *Dendrobies*, *D. Loddigisii* (pulchellum), a group of well-flowered specimens of *Vanda teres*, and, of course, numerous choice varieties of *Odontoglossum crispum*, were among the most attractive of the plants in Baron Schroeder's group. Sir Trevor Lawrence always sends many Orchids of botanical interest, and in this respect this year was no exception. Passing over the big and perfect specimens of *Cattleya*, *Dendrobium*, *Cypripedium* and *Odontoglossum*, we may note the pan of *Neottia Nidus-avis* with its brown flowers, *Trichocaulon longibracteatum* with white flowers stained with crimson on the front and side lobes of the lip, *Dendrobium Auguste-Victoria* with tall pseudo-bulbs and spikes in the way of *D. stratiotis*, *D. signatum aureum* with flowers of pale sulphur-yellow color, in form like those of *D. lituiflorum*, *Eria ornata* with a long hairy scape of large yellow-brown bracts and green flowers with orange lip, *Epidendrum Mooreanum*, a rather new species in the way of *E. virens*, with crimson blotches on the lip of the greenish yellow flowers, *Lycaste jugosa*, *Microstylis macrocheila* and a grand plant of the tiger-flowered *Maxillaria Sanderiana*.

Messrs. F. Sander & Co. were, as usual, liberal exhibitors. A large plant of *Cattleya Reineckiana*, bearing thirteen flowers and buds, was shown; also a new hybrid called *Lælio-Cattleya the Queen*, *Cattleya Rossii*, raised from *C. intermedia* and *C. Leopoldii*, bearing three spikes and eighteen flowers, which were like those of *intermedia*, but spotted and tinted as in *Leopoldii*. *Dendrobium Dalhousieanum* was represented by large specimens carrying dozens of spikes of its large yellow and crimson flowers, and *Anæctochilus Sanderianus*, one of the most charming of the genus, *Sobralia Veitchii* with large bluish-white flowers splashed with yellow in the throat, and *Stenoglottis longifolia*, and a pure white-flowered form of it revealed the charm of this pretty Cape terrestrial Orchid.

Messrs. H. Low & Co. sent some rare *Phalænopsis*, *Coelogyne asperata*, *C. pandurata* and a beautiful form of *Odontoglossum crispum* named *Queen Victoria*, to which a first-class certificate was awarded. It has medium-sized flowers, rose-tinted, with a large crimson-brown blotch on each segment. Messrs. Linden's group consisted almost wholly of *Odontoglossum crispum* varieties and forms of *Cattleya Mossiiæ*, the latter being superior to any that I have seen. They also sent a gigantic-flowered form of *C. Schilleriana*, to which a first-class certificate was awarded. The three choicest Orchids, sent by Messrs. Charlesworth, of Bradford, were *Sophro-Lælia Marriottiana*, raised from *S. grandiflora* and *L. flava*, *Lælio-Cattleya Lady Wigan*, to which a first-class certificate was awarded; it is a hybrid between *L. purpurata* and *C. Mossiiæ*. The third plant was a beautiful variety of *Odontoglossum excelens* named *R. Ashworth*. The most admired Orchid exhibited was a form of *Odontoglossum crispum* named *Starlight*. It bore a spike of six flowers nearly four inches across, with broad sepals and petals colored rose-purple and peppered all over with red-brown. It was sent by Mr. Broman White, and was awarded a first-class certificate. Connoisseurs bracketed with this truly lovely plant

a hybrid of unknown parentage, but showing evidences of *Laelia purpurata* and *Cattleya aurea*. It bore the cumbersome name of *Laelio-Cattleya Lyntesfieldiense*. The sepals and petals were rosy mauve, and the broad, wavy lip deep maroon-crimson almost to the base. It obtained a first-class certificate.

Luddemannia Lehmanni, bearing three spikes of bloom ;

been seen finer, and the *Caladiums* from Messrs. Laing and Veitch were marvels of good culture as well as creditable to the breeders of these plants, which have been greatly improved in the last ten years. Among the Carnations I noted several of excellence—*Duchess Consuelo*, a yellow in the way of *Germania*, and raised by Mr. Willans, gardener to the Duke of Marlborough ; James O'Brien, a large, full,



Fig. 30.—*Pinus muricata* on the coast of California.—See page 232.

very large specimens of *Cypripedium caudatum*, *C. Chapmani magnificum* (*Curtisii* × *bellatulum*), and another hybrid between *C. bellatulum* and *C. concolor* were other Orchids of special interest.

The collections of Roses, *Caladiums*, Carnations, herbaceous plants, *Rhododendrons* and other hardy flowering shrubs were rich and full of interest. Roses have never

deep crimson flower, and *The Pasha*, a yellowish salmon variety, shown by Messrs. Cutbush.

Crimson Rambler Rose is as popular as ever, some well-flowered specimens occurring in several of the big groups. A Tea Rose named *Enchantress*, with large flowers in the way of *A. Ollivier*, but paler, is a promising variety which Mr. W. Paul raised about two years ago. Messrs. Sutton's

Gloxinias, Cannells' Begonias, Cannas, Calceolarias and Gloxinias, Balchin's Boronias, Heaths, Phœnocomas and other hard-wooded plants, May's Ferns, Kelway's Pyrethrum, Iris, Aquilegias, Pæonies, Dobbie's Pansies and single Dahlias, Veitch's Streptocarpus and Phyllocactus, Wallace's Lilies, Iris, Calochortus and Brodiaeas, Jackman's hybrid Clematis, and Smith & Co.'s giant specimens of the popular large-flowered sorts, are collections which may be mentioned as having contributed largely to the success of the exhibition.

NEW PLANTS.—Messrs. Veitch showed a very large-flowered variety of *Hydrangea hortensis*, the barren flowers over two inches across and of a rich rose color. Messrs. Sander & Co. showed their new *Dracænas* and *Caladiums*, a variegated *Canna*, *Mapania pandanifolia*, two *Petunias* and *Davallia hirta*. Mr. Bull showed a form of *Ficus radicans* with silvery variegated leaves; he also showed his new *Anemia rotundifolia*, with long, narrow, pinnate, arched fronds, and *Crinum Moorei variegatum*. Monsieur Moser, of Marseilles, sent a new *Clematis* with large flowers, the petals pale rose, banded with cerise.

The number of new plants exhibited this year was exceptionally small. It is said to be due to the forthcoming Ghent Quinquennial Exhibition next year, at which one of the great features is always new plants, and for which the nurserymen appear to be holding themselves in reserve.

London.

W. Watson.

Cultural Department.

The Asparagus Rust Again.

THE season of 1896 was the first one in which the genuine rust of the Asparagus, *Puccinia asparagi*, had been observed in this country, at least in the eastern states, and in quantity to make its presence alarming. During the autumn months the Asparagus fields, instead of being a luxuriant green, turned to a brown, which suggested the ravages of an insect or the work of an untimely frost. Early in autumn the surface of the infested Asparagus stems was more or less covered with patches or pustules of an orange color, due to the myriads of spores that had formed in minute rifts and ruptures of the epidermis. Later on, in the fall, the same spots upon the stems became dark-colored, a brown form of spore having replaced the brighter one. In this condition the story of the outbreak and life history of the fungus closed for 1896.

This microscopic parasite has long been known in Europe, and has three forms, at least, in which it thrives upon the Asparagus. The brown pustules of late autumn, the stage in which the fungus passes the winter, are followed the next season by a form very different from either of the two previously mentioned. This is commonly known as the "cluster cup" stage, and consists, so far as the eye sees, of minute cup-shaped bodies which arise from the infested stem in small groups or clusters, hence the common name for this form of the rust fungi. This cluster cup form was to be expected as the beginning of the attack of the rust for the present year, and it appeared during the past week. On the third of June, samples of the cluster cup fungus were sent to me from the centre of a large area devoted to the cultivation of Asparagus. The cutting of the crop is at its height, and the rust is confined to young plants that are allowed to grow to gain strength for future years. The first rust was found upon the plants that grew in a vineyard that had been in Asparagus some years before. These were vigorous shoots that came from roots that had not been killed out. The clusters of cups are most frequently found upon the main stem and a foot or so above the ground, while not infrequently they appear close to the soil, and even the fine branches at the top of the plant are sometimes rusted.

An examination of young beds set this spring showed that these plants were bearing the fungus cups, and the beds of last year's setting were in like manner infested. The stems in old beds that are being cut from day to day do not stand long enough for the fungus to show itself, but after cutting ceases there is reasonable certainty that these beds will also show the first form of the rust, and be followed by the second and third stages of the fungus before the season closes.

It is too early to know the results that will follow the treatment recommended last autumn, namely, the cutting and

burning of the rusted plants. One thing is already certain and that is the great falling off of the yield. From reports received upon this point from various growers, and those in charge of shipments at the centres of Asparagus growing, it is gathered that the yield is not more than half that of the ordinary season. This may be due in small part to cool weather, but there is sufficient ground for attributing it largely to the rust, which was overwhelming in its attack last season. It is also learned that there is no material difference in the yield upon fields where the brush was cut and burned and where it was left standing through the winter. The effect of the burning upon the amount of rust later in the season will be looked for with much interest.

Growers of Asparagus are anxious to know what to do now in view of the fact that the first form of the rust is in sight. All Asparagus that is "growing wild" should be destroyed, as it is a propagating place for the rust. Spraying should be resorted to as soon as cutting is through and shoots begin to form for the season's work of assimilation. The Bordeaux mixture or some other standard fungicide may be applied at intervals of about ten days. The fungus is not in the group that has heretofore yielded promptly to this treatment, but there is hope of doing some good. The value of spraying with fungicides is being tested in the field of Asparagus upon the ground of the Experiment Station, and as soon as possible the results will be published.

New Jersey Experiment Station.

Byron D. Halsted.

Climbing Plants for the Greenhouse.

EVERY greenhouse provides some corner in which a climber can be displayed to advantage, though in a house of limited area judgment must be exercised in the selection of plants for this purpose. Where abundant space can be allowed for such rampant growers, the Tacsonias and Passifloras are especially beautiful, and quite a moderate temperature is generally sufficient for their needs—that is, the temperature of an intermediate house, say, from fifty-five to sixty degrees. The most satisfactory method of cultivating is to plant out in well-drained beds and train the growth without too much formality along wires attached to the roof.

Passiflora racemosa is one of the most satisfactory of the Passion-flowers, and from its habit of blooming from both young and growing shoots and also from the old hard wood, a well-established plant is seldom without flowers. Cuttings of firm young wood will root at almost any time, but as plants raised in this manner do not always start away freely, *P. racemosa* is frequently grafted on *P. Raddiana* or some other free-growing species. In grafting, the stock frequently suckers freely, and this objectionable feature requires watching.

Passiflora vitifolia, sometimes called *Tacsonia Buchananii*, is also an admirable climber and grows rapidly. After it becomes somewhat root-bound it flowers profusely, the solitary flowers hanging on long pedicels below the foliage. *Tacsonia Van Volxemii* is another favorite for conservatory decoration, and, while a rapid grower, neither the foliage nor wood is so coarse as that of the *P. vitifolia*, and it is more graceful. The flowers of this *Tacsonia* swing on slender stems, usually more than a foot in length. They are rich crimson in color and four to five inches in diameter, and altogether showy and attractive.

Tacsonia Exoniensis is a hybrid variety introduced some twenty years ago and resembles in habit *T. Van Volxemii*, but the leaves are smoother and the flowers deep pink. *T. insignis* is another handsome species and is also free in growth. The flowers are large and dark crimson, but cuttings do not root quite as readily as those of the two preceding Tacsonias, and I think *T. insignis* is less prolific in flowers, at least until the plant becomes slightly starved.

The Butterfly Vine, *Stigmaphyllon ciliatum*, flourishes under conditions similar to those required for Tacsonia. It flowers freely during the summer months, when planted out-of-doors, from Washington, District of Columbia, southward. It is much smaller in leaf and finer in growth than the Tacsonias, and is therefore adapted for smaller houses. It requires bright sunlight and a light, rich soil.

Thunbergia Harrisii, another old favorite, is suited for commodious quarters. While the individual flowers do not last very long, they are produced in profusion, and their shade of blue is none too common. *T. Harrisii* stands close pruning, which is fortunate, for mealy bug often attacks the plants, and the annual pruning gives a clean start, and thus saves trouble later in the season. Cuttings two to three joints in length, from rather light wood, will root quickly in rich loam with free watering.

The beds for these strong-growing climbers should be built

of brick or concrete, about three by two feet and eighteen inches deep. The drainage should be thorough and the soil rich and rather coarse—that is, only broken up with a spade in mixing. For a fertilizer I prefer bone-dust in moderate quantity, with a good proportion of barnyard manure.

If a house sufficiently cool is available, *Lapageria rosea* and *L. alba* should not be omitted, but unless the necessary conditions of coolness and abundant ventilation can be given these beautiful plants will not thrive, and insect attacks are likely to follow.

Stephanotis floribunda and one or two of the *Tecomas* are useful, and do not require great heat, but *Stephanotis* is another favorite of mealy bug, and strong syringing with a good pressure of water is necessary to keep down this pest.

Of the *Tecomas*, *T. jasminoides* and *T. Smithii* can be safely recommended. The first is a strong grower, and does not bloom freely until it has grown to considerable size, while *T. Smithii* flowers while quite small, and is satisfactory either as a pot-plant or when planted out. *Trachelosperma jasminoides* is well adapted for growing on a trellis in a pot or tub, and gives an abundant crop of white Jasmine-like flowers. A rather peaty soil is preferable, and a temperature no higher than forty-five to fifty degrees.

For warm-house treatment few, if any, climbers surpass some of the *Dipladenias*. These can be handled to better advantage in pots than when planted out in a house, and experience has shown that it is not necessary to coddle these plants, as was once the practice.

Holmesburg, Pa.

W. H. Taplin.

Hardy Rhododendrons.

RHODODENDRONS at Wellesley are exceptionally fine this season, owing to the mildness of the past winter and a favorable spring. The list of varieties once considered tender, and now regarded as hardy, is being gradually extended. New plantations not infrequently lose their first season's setting of buds, consequent upon insufficient root development. Even though all the conditions for successful cultivation are favorable, we should not decide as to hardiness after one, or even two years' testing. There has never been any doubt of the hardiness of hybrids in which the blood of our native *R. Catawbiense* prevails.

One must become interested enough in these plants to study somewhat the history of hybrid Rhododendrons in order to give them intelligent cultivation. We depend almost entirely upon European raisers, mostly English nurserymen, for our supply, and the consequence is many beautiful varieties, hardy enough in England, and recommended in good faith, have been imported, and proved altogether unsuitable to our climate. We find many of them injured beyond recovery after the first winter, while some linger on for a season or two. Loss of vitality, resulting from an ocean voyage and change of soil and climate must, of course, be allowed for. *R. Ponticum* is quite hardy in England, and is there considered the best parent for hybridizing and also as stock for grafting. While the good qualities of *R. Catawbiense* are recognized, and a plentiful infusion exists among standard sorts, it is, nevertheless, difficult to tell to what extent this is so. *R. arboreum*, the Himalayan species, and the tenderest of this type, is also used as a parent. It is from this species that we get the finely tinted rose, crimson and ruby-red shades so much desired. But in proportion as *R. arboreum* and *R. Ponticum* enter into the parentage of a hybrid, the less reliable is it for American cultivators, especially in this latitude.

When it is not possible to know the history of the varieties we wish to grow, we must trust to the recommendations of raisers and dealers who use our native species as a parent or stock. The Messrs. Waterer, of England, have made a specialty for many years of raising varieties for the American trade, and nearly all the finest varieties in our gardens have come from them. Many of the so-called tender varieties are conspicuous for the size of their individual flowers, the form and size of the truss, distinct colors and splendid markings. To establish, to acclimatize these has been slow work. The material at first was not the best. Large old plants which have been moved in and out of cover for a number of years, and which are likely to be out of health, are not the most favorable subjects to experiment with. As a rule, they take hold slowly, but the expected loss from winter cold has not proved serious. It does not appear so much a question of constitutional weakness as to get the flower-buds thoroughly matured and to find proper protection for them. There is generally a good setting of buds, but without flowers the most ardent enthusiast is apt to lose courage. The plants screened from the irritating effects of bright sunshine during winter suffer least, and on this

suggestion most experiments have been carried out with satisfactory results, and so every year varieties are taken from the doubtful list and counted as hardy. Frequent examinations throughout the winter show that during the severest weather the buds kept sound, and not until the sharp changes from low night temperature to bright, often warm, days in March and early April does the real injury occur. Plants sheltered from the north and exposed to the full sun suffer most.

A list of choice varieties not generally found to be hardy in this neighborhood, and which have been out several winters and are now in fine condition, includes *Duchess of Sutherland*, rosy lilac, deeper margin; *Princess Mary of Cambridge*, blush, edged with carmine; *F. D. Godman*, crimson, large dark standard petal, fine foliage; *James Mackintosh*, rosy scarlet, fine truss; *Marshall Brooks*, rich scarlet, with bronze spots, distinct and beautiful; *John Walter*, rich crimson, fine form, very effective; *Charles Thorold*, purple, bronze standard, fine habit and good foliage; *Mrs. C. Thorold*, bright pink, yellow centre, distinct and beautiful; *Mrs. Shuttleworth*, scarlet, lighter centre, spotted, very attractive; *Lady Rolle*, white, spotted; *Mrs. Heywood*, bright rose, free; *Countess of Normanton*, blush-white, dark spotted, showy; *Mrs. J. P. Lade*, French gray, deeper centre, fine truss.

Among a large number of varieties reliable as to hardiness the following are noteworthy for fine colors, large flowers and handsome trusses: *Lady Armstrong*, rosy spotted, early; *Caractacus*, deep crimson, one of the best for all purposes; *Mrs. John Clutton*, splendid white, standard petal spotted yellow; *Mrs. C. S. Sargent*, rosy, marked with yellow, handsome foliage; *E. S. Rand*, rich scarlet; *Selton*, purple, large flowers, late; *Lady Crossley*, deep rose, distinct, early; *Queen*, blush, nicely marked, with yellow spots, requires shade; *Lady Grey Egerton*, silvery rose, large truss, handsome; *Mr. H. H. Hunnewell*, deep rose, bold truss; *Charles Bagley*, cherry red; *Mrs. Henry S. Hunnewell*, very fine white, will prove our best white; *King of the Purples*, striking color; *Album elegans*, blush, changing to white; *Album grandiflorum*, white; *Delicatissimum*, valuable on account of being late and associated with a mass of *Kalmia latifolia*, comes into bloom at the same time; *Ralph Sanders*, rich purplish crimson; *F. L. Ames*, probably the most striking of any of the rosy-flowered varieties, the flowers very large, truss well built, color blush, with deeper edge. Mum would be my choice among nearly two hundred varieties. It is white, with creamy spots on the standard petal, the flowers are extra large and the truss superbly formed, but it is doubtfully hardy. Plants which have been out for two years are blooming sparsely this spring, and it is hoped when better established it may prove entirely hardy.

Wellesley, Mass.

T. D. Hatfield.

The Cultivation of *Dionæa*.

IT is seldom this wonderful little plant is seen in a good state of cultivation any length of time after removal from its native haunts. Its cultivation in a greenhouse is usually attended with more or less difficulty, owing to unsuitable conditions, such as too much dry air, shade or unfriendly soil. It delights in full sunshine with a very humid atmosphere. When the plants can be secured and transplanted with considerable of the soil in which they grow attached to the bulb-like root-stock they are quite easily dealt with, and may be kept in a healthy growing state for years. I find a round, hanging earthenware receptacle most useful to grow them in; the bottom is carefully drained, first with large pieces of broken pots, then smaller pieces, and the upper layer is quite fine. Some chopped fibrous peat is placed above this, when the plants are built in, with live sphagnum moss used to fill the spaces between the clumps. Arranged in this way, it is hardly possible to give them too much water, and they revel in abundant supplies. If kept in the sun the leaves take on a reddish tinge, but when grown in the shade they are always green. Flowers will develop about this time, but they should be nipped off as they make their appearance, for they are apt to weaken the plant.

The *Dionæa* has been grown successfully in a dwelling-house by quite a different method. The plants were in a wide shallow dish without any drainage, and simply placed, not too firmly, in loose live sphagnum moss, with a glass covering. Water was given every other day by filling the space above the plants until the dish was filled, and then it was poured off. In this way the potting material never became sour. From the luxuriant condition in which these plants remained for years, I am inclined to think this to have been a close imitation of the conditions under which they thrive in a wild state. Some years ago, owing to Professor Asa Gray's endeavor to

have the Government purchase a strip of land on which this plant grows, there existed a widespread idea that it was gradually becoming extinct. There seems to be little likelihood of this calamity, however, as *Dionæa* is found abundantly in some places all the way from Wilmington to Fayetteville, in North Carolina. Its permanency is all the more assured seeing that the plants thrive on soil which is of little use for agricultural purposes.

Botanic Garden, Washington, D. C.

G. W. Oliver.

June Irises.

EARLY in June, just as the bloom of hybrid German Irises is waning, we may expect the flowers of another group scarcely less interesting and with colors as bright as those of any of the family. These Spanish Irises are bulbous and natives of south-western Europe and northern Africa. While there are several species and numerous hybrids in the group varying somewhat in hardiness, those which are classed by the Dutch bulb growers as Spanish Irises are all perfectly hardy in this latitude with no protection. They are yellow, blue, blue-purple and white, selfs and in combination, and sometimes with an admixture of brown. The Spanish Irises have narrow leaves which spear in early winter, and they flower at about eighteen inches in height. There are three forms in general cultivation; those with narrow falls spreading laterally are the most common; the Portuguese yellow form, *I. Lusitanica*, has relatively broad falls which rise slantingly, and there is a vigorous old form known as *The Thunderbolt*, with bronzy flowers, which is larger in all its parts. As most of these Irises may be had at a low price they should be planted in large groups, when they are most effective, and in the open, where they will receive the full benefit of spring rains, or if these are lacking they require generous waterings. A full supply of water in the spring is necessary to their successful growth and flowering, even if they have been well matured the previous summer. They have flowered particularly well this wet season, and some neglected bulbs which seldom flower, owing to too dry a location, have been brought forward by the abundant recent rains.

Some of the bulbous Irises are scarce even at a high price, and too many dealers fill orders for these with Spanish Irises, always at high prices. Having been at the losing end of such transactions a number of times, I offer the suggestion that consignments of bulbs should be compared with one's stock of bulbs of Spanish Irises and those of the same form under different names should be regarded with some reserve.

Elizabeth, N. J.

J. N. Gerard.

Asparagus Sprengeri.—This can no longer be considered a new plant, for it is well distributed over the continent now, and those who were fortunate enough to secure plants early are beginning to enjoy the results of their venture, for the purchase of new plants is speculation of the purest kind. Not only do the plants sometimes vary from the published descriptions, but their behavior is sometimes extremely local, a fault the vender is not to be held responsible for. I am told that in Italy, where Mr. Sprenger had the original plants growing, the stems were upward of eight feet high and studded over with brilliant scarlet seeds, and the visitor who was my informant was most enthusiastic over the plant. *Asparagus Sprengeri* promises to be even more durable when cut than either of the other kinds now so commonly grown, and though it will never supplant *A. plumosus* and *A. tenuissimus* in public favor, it will make a sure place for itself. Our largest plant is now in a twelve-inch pot, and cultivators will find that unlimited pot-room is essential for its success, or it must be planted out. The tubers are so numerous that they soon push the soil up out of the pot. The new potting material, Jaddoo fibre, is said to be best suited for such plants. It affords free root-room and enables the tubers to expand in the pots. The flowers of *A. Sprengeri* are quite pretty, being pure white on short racemes, and the anthers are of a bright orange color. It is decidedly ornamental when in bloom, and one can easily understand the effect of the red berries when ripe. The plant must be propagated from seeds; cuttings will not root, as with *A. tenuissimus*. Seeds must be freely obtainable, to judge from the rapidity of its distribution recently.

South Lancaster, Mass.

E. O. Orpet.

Ranunculus Ficaria.—This is an interesting Buttercup which appears to have made its way to America now for the first time. It was found growing as a weed in a pot with some imported greenhouse plants about two years ago, and is now well established in a small way in one or two Buffalo gardens. It much resembles the *Caltha* and blossoms even earlier, so that

it will be valuable in the list of April bloomers. The leaves are less than half the size of those of the *Caltha* and run from round heart-shape into broadly halberd-shape or sagittate; they are smooth, growing in a cluster that entirely conceals the short stems, from which the numerous scape-like golden-yellow flowers rise. The peculiarity which distinguishes it from allied plants is the production of numerous elongated, whitish tubers of the size of small peas. These are readily separated some distance from the parent plant, and the plants that spring from them also bear tubers before they are large enough to blossom. The plant disappears after maturing its tubers, not waiting to bear seed, but is perennial and reappears the next season. This *Ranunculus* was known to Linnæus, who appears to have found it under the common name of *Ficaria*, the fig plant, and incorporated the name into its scientific title, as he so often did in other instances.

Buffalo, N. Y.

John Chamberlin.

Correspondence.

A Garden of Roses.

To the Editor of GARDEN AND FOREST:

Sir,—In reference to Mr. Gerard's article on garden Roses, on page 217 of GARDEN AND FOREST, I must put in a plea for the so-called Hybrid Perpetuals, because of their splendid decorative effects in the June garden. It is true that their blooming season is soon past, but that is equally true of all shrubs and flowering trees, and of most herbaceous plants as well. We would hardly miss any other flowers so much as these. Their flowers are so large and showy, and so freely produced, and the plants grow to so much larger size than the Teas that I think them preëminently desirable in any garden where there is space enough to admit of their full development. Their foliage is beautiful, and the new growth has fine coloring, so that with their graceful habit of growth when allowed to develop naturally they are attractive throughout the summer after the flowering season is past. Besides, they do give flowers occasionally in late summer and in the fall. As I write there is before me a garden of Roses in their prime, consisting entirely of June Roses and Hybrid Perpetuals. Here Ulrich Brunner forms a large bush with a hundred perfect roses of a rich, dark, velvety red. *R. multiflora* has taken possession of a Mulberry-tree, over which it rambles and which it has clothed with a beautiful garment of shining, healthy foliage and masses of pure white clustered flowers. In this lovely wilderness Paul Neyron is trained to a stake twelve feet high, and from this elevation its immense roses overlook all their neighbors. Abel Carrière has a little trellis to support it, not too stiffly, and is covered with its beautiful crimson blooms. Giant of Battles was one of the first to open here, long before a Tea Rose had shown its color. It is ten feet in height, the main stem tied to a stake from which many wand-like branches depend, blooming in beautiful profusion. Old-fashioned double white Roses, such as *Microphylla*, *Coquette des Alpes* and *Madame Plantier* blend with the deep red flowers I have named, and the queen of them all is *Madame Alfred Carrière*, which needs an arbor to itself on which to display the flushed blossoms with their exquisite fragrance.

In this old garden most of the Roses are old, and there are many Hundred-leaved Roses and Rose of Provence, Burnet, Damask, Moss and Cinnamon Roses in waste places and rock-brakes, growing as they will. The well-ordered beds of Teas, beautiful as they are, seem small and tame by comparison. Hybrid Perpetuals increase in beauty every year, and this is seldom true of the Teas, which must be often replanted. But almost every type of Rose is beautiful and desirable, and the Rose lover is likely to find room in his heart and in his garden for all.

The Lord Penzance hybrid Sweetbriers have proved themselves good growers, and are hardy and satisfactory here. The flowers are usually larger and of finer coloring than those of the parent Sweetbrier, while the foliage of all is pleasantly fragrant. The old Sweetbrier is a delightful plant for the wild garden. Often it has a half-weeping habit. There is some difference in the color of its flowers, which, in a wild state, range from nearly white to a clear pink. The finest Rose for color which has ever opened at Rose Brake is a Copper Austrian Brier now just out of bloom. It is curious to find a Rose with petals of scarlet velvet, almost the hue of a vivid scarlet Geranium. The blossoms seem on fire with their own beauty. This color is altogether unique among Roses. The foliage is very fragrant, something like that of the Sweetbrier, but more spicy. Our specimen is planted where it can scramble at will over a ledge of rocks, in company with such Roses

as *Rosa setigera* and Harrison's Yellow, the yellow Austrian Brier, the old Persian Yellow and others adapted for such a position, where Teas and even Hybrid Perpetuals would be out of place.

Shepherdstown, W. Va.

Danske Dandridge.

Edible Wild Plants.

To the Editor of GARDEN AND FOREST:

Sir,—This is the season of "greens" and of more or less speculation on the edibility of wild plants. Looking over the list, and omitting the fruits of native plants as well as the bark of the Birch and the Sassafras, the young growth of the Beech-nut and one or two species of *Allium*, all of which are eaten raw, if at all, the number left for cooking entire is remarkably small.

Besides, there is no little misconception of the wholesomeness of many well-known plants. A writer on wild flowers has published a volume in which the reader is warned against the poisonous qualities of the Trillium, and there are many less learned notions equally as erroneous, so that the seeker after herb-food is unnecessarily timid. There is nothing poisonous about the Trillium, as I can testify from personal use of it for greens, particularly *T. erectum* and *T. erythrocarpum*, both of which are esteemed by those who have eaten them. *T. grandiflorum* is, no doubt, quite as wholesome, but it did not happen to grow within the limit of my excursions for native plants in boyhood days.

Early "greens" gathered in the lowlands include the Cowslip, a common name for the Marsh Marigold, *Caltha palustris*, but, like most edible plants, it becomes tough and bitter when in full blossom, and it is therefore soon worthless. About the cities the Dandelion is the great dependence for greens, and no amount of attack with knives in cutting off the crown of the plant will kill it—as in case of the Burdock and many other tap-rooted plants—for the Dandelion root is too much of a root-stock not to sprout again.

Many plants of the Mustard family, which are related closely to the Mustard itself and the Cabbage, are good for greens. Turnip and Cabbage stumps are sometimes planted in spring for this purpose. Of the Borage family, the Comfrey makes good greens when gathered young. The common Adder's-tongue, *Erythronium Americanum*, is sometimes used, and one or two species of Nettle, gathered with gloves, come into the list. Milkweed, treated much after the fashion of Asparagus, is esteemed where it grows in plenty.

Of weeds in cultivated grounds the narrow-leaved Dock, *Rumex crispus*, is used, but its neighbor, the Yellow Dock, *R. obtusifolius*, though much resembling it, is rejected. The common "Pusley," *Portulaca oleracea*, would also come into the list but for the fact that its stems, even after they are cooked, suggest angle-worms too vividly. There is a species of *Amaranth* common as a rampant weed in gardens where it obtains a foothold, sometimes known as Red-root, *Amaranthus retroflexus*, that is closely enough allied to the Beet and to Spinach to approach their high standard for greens. It must be used young, before the root becomes woody. The tall Pigweed, or Lamb's-quarters, *Chenopodium album*, is eaten, but its meanness is not always relished.

Potato tops may be used in connection with other plants, but, as a rule, the *Solanum* family is too close to the line of poisonous plants to be eaten in the wild state. There is an innocent plant which, where it is plentiful, furnishes all the requisite qualities for greens. This is *Hydrophyllum Virginicum*, sometimes known as Boston Cabbage. It grows rampantly and usually forms a mass of broadly pinnate leaves. Coming up early, it will reappear after being picked off, and it does not become woody or bitter for a long time. As it takes full possession of the ground when given the opportunity, and is in no sense a weed, it seems that it might be introduced into semi-cultivation with profit, choosing a moist and partly shady spot.

Buffalo, N. Y.

John Chamberlin.

The Nomenclature of Abies.

To the Editor of GARDEN AND FOREST:

Sir,—Professor Greene (*GARDEN AND FOREST*, vol. x., p. 188) thinks that I overlooked some important considerations in my discussion of the nomenclature of the White Spruce. As a matter of fact, these considerations had presented themselves to my mind, but not attributing any very great importance to them I refrained from bringing them into the discussion. A binomial, or species, is published, according to the Rochester code, either by citing one or more binomials, with the name

of the author, publication, date, etc., as synonyms, or by giving a proper diagnosis in some scientific or other publication. In 1739 Gronovius published a flora of Virginia, in which he described an *Abies foliis solitaris* . . . membranaceis. So far as I am aware, all subsequent authors have considered that Gronovius had in view and described the Hemlock. In 1760 Miller described an *Abies foliis piceæ* . . . laxis (*Icones*, i., t. 1); there is no question but that Miller described, as he intended to, one of the Spruces other than the Hemlock. In the *Species Plantarum*, in 1763, Linnæus published a *Pinus Canadensis*, with the diagnosis *P. foliis* . . . submembranaceis, and quoting as first synonym the Gronovian description, Linnæus thinking (though erroneously) that Miller's species was the same, cited the latter's description as a second synonym. Professor Greene suggests that the Linnæan and Gronovian descriptions, which, at any rate, are synonymous, may not mean anything other than the White Spruce, but it is not likely that authors have since their time been so uniformly mistaken in interpreting their meaning. A reference to the Gronovian and Linnæan herbaria may throw some light upon this question, however. Miller in 1768 described an *Abies Canadensis*, using the Linnæan diagnosis, and quoting his own earlier description. Three things, then, are evident: that Gronovius and Linnæus had in view and described the Hemlock; that Linnæus erroneously thought that Miller's plant was the same as the Gronovian, and therefore that two species entered into the make-up of his *Pinus Canadensis*, which was founded primarily upon the Gronovian description—the Hemlock; that Miller followed Linnæus in thinking that his plant and the Gronovian were one and the same, but differed from Linnæus in having in view one of the Spruces instead of the Hemlock. Now, regardless of the fact that Linnæus had the Hemlock in view for his *Pinus Canadensis*, and that Miller had in view one of the Spruces for his *Abies Canadensis*, the two names must be considered according to the Rochester code as synonymous, since the diagnosis and synonymy in both are the same.

Detroit, Mich.

O. A. Farwell.

Recent Publications.

The Plant World. Its Romances and Realities. Compiled and edited by Frank Vincent, M.A. New York: D. Appleton & Co.

This is one of the series of books which has been prepared under the supervision of W. T. Harris, United States Commissioner of Education, to furnish systematic home reading on natural history and other subjects. The books are prepared to carry out the University Extension idea and furnish opportunities for self-cultivation after school days are over, and this one, devoted to botanical subjects, can be used as a school reader. Of course, there cannot be much systematic science included in the fifty disconnected extracts found in this little volume, but they are all on interesting subjects, they are usually prepared by competent hands, and they certainly have the charm of variety. We have no reason to expect that the study of botany or any other science will receive any essential impulse from efforts of this sort. The real beginning of the study of nature comes from direct observation of natural objects. Nevertheless, books like this present in an interesting way many facts which ought to be known to persons of ordinary cultivation. It is a good thing for any young person to know something about the distribution of Ferns, the uses of the Cocoanut-tree, the Bread-fruit-tree and the Bamboo, and to get some idea of the botanic garden at Paradenza and the Cinnamon gardens of Ceylon. These are some of the topics treated in this collection, while among the selections which seem to have been arranged by chance are sprinkled short poems by Shelley, Longfellow, Whittier, Thomson and others. An editor thoroughly conversant with the literature of botany might have made a hundred books of this size, each one as good or better than this, and we should have liked this better if our *Sequoia* did not appear in it under the name of *Wellingtonia*. The illustrations are suggestive and helpful, and the frontispiece shows an avenue of Royal Palms in Rio Janeiro which in a striking way sets forth the value of these remarkable trees for what may be termed architectural planting.

Notes.

At the beginning of a useful bulletin on spray-pumps and spraying, just issued by the New York Experiment Station, is the following important notice: Do not spray trees and plants when in bloom. It is in no instance necessary or desirable. Not only is this practice liable to injure the delicate parts of the flower, but, what is even more important, it poisons the bees and other insects that are our friends. It would be impossible to grow some of our fruits in commercial quantities without the aid of insects in fertilizing the blossoms.

One of the latest bulletins of the Cornell Experiment Station has been prepared by C. E. Hunn and Professor Bailey on Strawberries under Glass. After quoting a note from this journal to the effect that pots of Strawberry plants in fruit were among the specialties for sale on Broadway at Easter, the writers of the bulletin add that nothing in their experience has ever aroused so much enthusiasm from plant lovers as forced strawberries, and that it is difficult to conceive of anything better suited to table decoration than a clean pot with a thrifty, well-formed Strawberry plant bearing from six to eight full ripe berries and a few blossoms.

Like many other flowering plants, *Hemerocallis flava* has been unusually handsome this year. The Pæonies, Oriental Poppies, German Irises and other tall plants with large flowers which bloom about the first of June have never been more showy. By the way, *The Gardeners' Chronicle* of June 5th speaks of a hybrid between *Hemerocallis flava* and *H. Middendorffii*, which has appeared in the garden of our correspondent, Dr. Christ, of Basle. The resemblance of the hybrid to the latter plant is shown in its shorter flower-stalk and in the color of the flower, while in its inflorescence and the length of the tube it more closely resembles *H. flava*.

By long cultivation and crossing the Mock Oranges have assumed a great variety of form. Some of them belonging to the group of which *Philadelphus coronarius* is the best known, are more beautiful than the type, with much larger flowers and an odor which is not so oppressively sweet. These have all passed their bloom in this latitude, and *P. Zeyheri* is just coming into flower. It is an old shrub, quite distinct from the rest of the genus, and was distributed in America many years ago by the Messrs. Parsons, of Flushing, Long Island. It has smaller and more scattered leaves, arching branches six or eight feet high, and flowers with narrow pointed petals, which are star-shaped when looked at directly in front, although their general outlines are somewhat like those of a bell. It is altogether a pleasing addition to the shrubbery, and could hardly be spared even in this season of abundant flowers.

Clematis crispa, which is a native of the river-bottoms and swamps of our southern states, is already opening its fragrant lilac-purple cylindrical flowers, and it will continue to produce them until they are killed by heavy frosts in November. These flowers are not as showy as those of *C. coccinea*, which are longer, vase-shaped and bright pink, deepening toward scarlet. In spite of the fact that it is a native of Texas, *C. coccinea* is quite hardy in New England. Both of these plants have a long period of bloom and both bloom very late in autumn, in spite of their southern origin. Last year we noticed two or three rods of fence covered with these vines mingled together, and the effect was very pleasing. *C. coccinea* has rather sparse foliage, but this defect was remedied by the abundant leaves of *C. crispa*. A screen covered with these two vines would make an interesting display of foliage and flowers every day for four or five consecutive months.

Mr. A. H. Kirkland, who has been assisting Dr. Fernald, of the Gipsy Moth Committee, has prepared a paper on the habits and food of the American toad, which has just been published as a bulletin by the Hatch Experiment Station, at Amherst, Massachusetts. After an introduction, in which the ancient ideas as to the venomous qualities of this animal are set forth in a very readable manner, Mr. Kirkland gives statistics which show that only eleven per cent. of the toad's food is composed of insects and spiders which are beneficial or indirectly helpful to man, while eighty per cent. of its food consists of insects and other animals directly injurious to cultivated crops or in other ways obnoxious to man. This shows a record which will compare favorably with that of any of our insectivorous birds, and it is suggested that the boys, who are its most continuous persecutors, should be instructed as to its habits and that laws should be enacted to arrest its wanton destruction.

Receipts of apples are becoming light, and last week was the first of the season in which none have been shipped abroad

from this port. Northern Spies, from this state, are the choicest apples now seen in the local markets, with Ben Davis, Roxbury and Golden Russets. Pears are already included in the new-crop fruits now in season, and the first Le Contes have arrived from Florida. Botan and Chickasaw plums are also coming from the same state, and the first Alexander peaches arrived from California last week, with the same variety from the southern Atlantic states. Cherries are plentiful from near-by points, and those from California, larger and of preferable quality, have been exceptionally cheap, owing to dull business during the rainy weather of early June. Strawberries of all grades may be had from Maryland, Delaware, New Jersey, Staten Island and the Hudson River section in this state. Gandy's Prize is one of the best sorts. No more handsome berries than those now coming from Hilton, New Jersey, have ever been seen here. Besides other field and garden fruits from the southern states, there are still some Valencia oranges from California, with the first cherry plums and apricots. Twenty-six car-loads of California fruit were sold here last week, mostly cherries and apricots.

Mr. W. R. Dodson, the Botanist of the Louisiana Experiment Station, has been examining the tubercles on the roots of leguminous plants by means of which nitrogen is taken from the air and used as a food material for the plants. The experiment seems to indicate that each plant, or at most each genus of plants, will support only one kind of parasitic organism capable of developing root tubercles. For instance, a particular organism must be present in the soil if tubercles are formed on Alfalfa, and any quantity of Cow Peas or other leguminous plants will not furnish the proper form of life. The Cow Pea likewise has its peculiar parasite, and dozens of leguminous plants may be grown side by side and each develop its own specific tubercle. Nevertheless, several imported species have been grown and formed tubercles, although the plants were not found in this country and have never been grown in the soil, which seems to indicate that the organism must have been in the soil before the seeds were planted, as there could have been no inoculation from soil in which the plant had been previously grown. If this is true, the organisms are not dependent on any particular plant for their existence, although the plant may be dependent upon them for its fullest development. Their absence from some soils and presence in others cannot, therefore, be explained satisfactorily. While the tubercles have peculiarities of shape or appearance they do not present characteristics that enable one to distinguish them under the microscope, although there are probably as many varieties as there are species of leguminous plants. The fact is that much is to be learned on this important subject before farmers can inoculate their soils with the assurance of success with any given crop.

An interesting bulletin in popular form has just been issued by the Geneva Experiment Station of this state in relation to Gooseberries. There are two native American species, *Ribes cynosbati*, with prickly fruit, and *R. occycanthoides*, with smooth fruit. The European Gooseberries, *R. grossularia*, have been cultivated for generations, and, at least, a great number of varieties of this species are being tested at Geneva. These bear large and beautiful fruit, but the plants are so liable to mildew in this country that unless this can be checked they are of little value. Many of them bear fruit an inch and a half long and an inch or more in diameter, while the fruit of the native varieties is smaller and less varied in color. In quality the best American sorts are superior to the foreign kinds, since they have thinner skin and a more delicate flavor, and in spite of the smallness of the fruit they are more productive than the foreign varieties. Downing, Houghton, Crystal and Red Jacket are among the best of the American sorts. The well-known mildew is a fungus which grows on the surface of the green shoots, the foliage and the fruit, at first frost-like, and covering later the affected parts with brown or black felt-like patches. To check this fungus the plant should be set in well-drained soil in high locations where the free circulation of air is not hindered by tight fences or wind-breaks of any kind, so that rapid evaporation of dew will be secured. Shallow cultivation, keeping the soil light and free from weeds, and pruning to admit air currents are also essential. The Bordeaux mixture is liable to spot the fruit, and it is, therefore, better to spray the bushes as soon as the buds begin to open with potassium sulphide in a solution of one pound of sulphide to thirty-two gallons of water. If one is prepared to make a determined fight against the mildew in this way he can successfully raise European sorts like Industry, Crown Bob and Wellington Glory, and secure fruit both early and late of striking size and color.

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The Park System of Greater Boston.

WE have several times made allusion to the Metropolitan Park System, which includes public holdings in various cities and towns within a radius of twelve miles from the Boston State House. Under an act of the Massachusetts Legislature passed in 1893 a Board was appointed to take charge of this system in the thirty-seven cities and towns which make up what is known as the Metropolitan District. Outside of the parks of Boston proper this Commission now has charge of about 6,800 acres of land, and the appropriations thus far made for the use of the Board have amounted to \$4,300,000. The annual reports of the Metropolitan Park Commission have always had a genuine educational value, as they give an account of the first intelligent effort at providing a comprehensive and consistent park system for so large an area, with its separate reservations under different governments, and covering a territory which will soon be densely populated. These different pleasure-grounds are judiciously distributed from the great Middlesex Fells and Lynn Woods Reservation on the north, down through the Fens, Franklin Park and the Arnold Arboretum, to the 4,000 acres of the Blue Hills on the south, and from the magnificent stretch of Revere Beach, which fronts the open sea, to the unique water parkway into which it is proposed to convert the Charles River, stretching out to the west. These reservations are not only connected with the populous centre of the district by cheap and rapid means of transportation by electric cars, but stately parkways will provide dignified approaches to the larger pleasure-grounds and make them agreeably accessible to those who do not choose to take a public conveyance.

In the report lately issued it is a pleasure to note that the Commission holds to the same high purpose, primarily insisting that the foundation work for the future shall be broad-set and firm, and not making any nervous haste for immediate effect. Here is one great undertaking in which nothing is left to chance. No detail is attacked in a desultory or unrelated way or until there is a general design which will enable those who are entrusted with its development to work with a definite purpose at every point and all the time. A moment's reflection will convince

any one that this is the only common-sense way of treating such a work, and yet we believe the Metropolitan Park System of Boston is unique in that not only the original selection of the reservations, but the adjustment of their boundaries and the choice of routes for parkways to connect them, have been matters of design. It may be added that no detail of construction is begun in any one of the reservations until the same close study has been made of its interior features as has been given to the general scheme. In nine cases out of ten the designers of public parks find that some city has come into possession of a certain number of acres of land by some chance, and then this land is modeled or planned without any particular relation to other pleasure-grounds or to the means of reaching them. In this city, for instance, we have half a dozen so-called parks lying north of the Harlem River, ranging in area from seventeen hundred acres to a hundred in size. No intelligent study of their boundaries has been made. Some of these come within a few feet of an existing street, but leave a narrow strip of land between the park and the roadway. There is little doubt that in any one of them a skilled designer could point out how the possession of a few acres outside of the line would be invaluable for completing a picture or furnishing some desirable feature, and how a certain area in another place might be surrendered with little loss and sold. In Bronx Park, plans have already been prepared for a botanical garden and for a zoölogical garden, without any suggestions as to the revision of the limits of the park, and without any adequate study of its approaches or surroundings. We may add that these so-called parks above the Harlem have not even been surveyed, while new roads are being built all about them without any thought of their relation to the parks, and many of the parks themselves are cut by roads for traffic and thus needlessly turned over to business when they might as well have been made pleasure-grounds pure and simple.

No doubt, the Park Commissioners of Greater Boston are right when they say that the reservations already acquired are a distinct addition to the resources of the commonwealth, and that considered as salable assets to-day they are worth more than they have cost. No doubt, too, they have a higher value than this in the renown they bring to Metropolitan Boston, and in the health and pleasure they will give to its future population. Beyond question, this pleasure is greater because the new park system is the result of study and not of chance, and it seems a thousand pities that other cities will go on acquiring costly lands and then allow them to fail of their highest purpose by neglecting to treat them as they do any other great work. As to the necessity of a careful study which not only includes the topography, but the different kinds of vegetation in all its parts before any roads are built or spaces are cleared, the landscape-architects say:

To us it seems that a due regard for the high purpose of public reservations, as well as a due regard for the economical fulfillment of that purpose, prohibits piecemeal, unrelated and hand-to-mouth work in such domains, precisely as it prohibits planless and disconnected work for the accomplishment of any and every large purpose that can be imagined—for the purpose of sewerage and water commissions, or trustees of art museums and public libraries, for example. Park commissions are the trustees of the people's treasures of scenery; they are responsible for the safeguarding and the increase of this treasure, and they are charged with the duty of making it most effectively accessible. Being trustees they cannot safely proceed planlessly any more than can they who are charged with guarding and making accessible the people's treasure of books and pictures, or with providing the people's drinking water. The devising of comprehensive and far-seeing plans or programmes of procedure is for park commissions as well as for all other executive bodies the most necessary, arduous and responsible labor which they are called upon to perform.

It is clear that if the natural beauty of any place is to be preserved and its poetic charm is to be enhanced, while at the same time it is made accessible to thousands of visitors every day, this is the one thing that requires the

most considerate and prophetic planning. Leaving a reservation alone is to encourage monotony and obliterate scenery, and if there is to be any enrichment of the landscape beauty of a place there must be a programme of work devised which looks specially toward the controlling and directing of its vegetation. Fortunately, the two great reservations, Middlesex Fells and the Blue Hills, are wild picturesque lands which for the present need little more than forest treatment. If the energies of the Commissioners for a score of years to come are directed to the work of restoring and improving these woods they will not only be constantly increasing in beauty, but they will make an object-lesson of great value to the entire country. Of course, all this is to be done with intelligent attention to lines of permanent roads to come and of the points of view which command choice stretches of scenery. This means the recognition in a broad way of all the essentials of the landscape until more elaborate and detailed plans are needed. We do not invite attention to this work of the Commission because it is novel in theory, or because any intelligent person will think of disputing its soundness, but because in practice it is constantly violated, greatly to the increase of the cost of constructing and maintaining pleasure-grounds, and to the diminution of their actual value.

Private Forestry and State Forestry.—II.

NOW, let us imagine that a tract of Michigan White Pine forest is suddenly transported by some unknown agency into the heart of Germany, say, to the neighborhood of Dresden, and let us further imagine a capable, well-informed forester in charge of it. What is the forester likely to do with it? Will he remove in each year from the entire tract no more timber than the annual increment allows, so as not to reduce the specific quantity of timber which constitutes the entire growing stock? Will he cut only trees of mature age likely to die if not felled? No. The forest administration would proceed in much the same way of the Michigan lumberman. It would not allow a large capital to lie idle, bearing very small interest, but would convert the timber into money as soon as possible, establishing at the same time, by skillful cutting of the trees, a second growth consisting of seedlings and trees of pole size, the annual increment of which is sufficient to pay ample interest on the capital which they represent. The woods would not be entirely cleared in a single year, simply because it would not pay well. The seedling growth left on the ground by the method of successive cutting has a value which more than covers the extra expense for successive cuttings, when these are carefully made in a way to avoid injuring the second growth. Of course, such seedlings are not valued for the timber they actually contain, but because they will ultimately produce timber. German foresters know that a piece of woodland which in twenty-five years will contain 5,000 feet, worth \$30.00, is now worth \$8.86,* and, after harvesting that, there will be another crop worth then about \$8.86, and worth now \$2.62.

The financial principle, of course, holds good for America as well as for Germany, and, if only the circumstances were the same, the lumberman would do exactly as the German forester does. The American lumberman, if he cut the tree crop carefully, would certainly succeed in establishing a second growth consisting of seedlings and small trees; from the annual increment of the second growth a reasonable interest might be derived on the extra expense of careful cutting and on the capital value of small trees left standing. But if the lumberman succeeds in doing that he is not at all sure that the second growth on a certain area will develop into \$30.00 worth of timber within twenty-five years, and no one would give him \$8.86 in exchange for it, because it is much more likely that the entire second

growth will be eaten up by fire* than that it will reach timber size within the next twenty-five years. Abroad, where forest fires are practically unknown, money invested in timber production is considered safer than if invested in Government bonds, and for this reason three per cent. per annum on the forest capital is considered an ample return. In this country no one would think of investing money in growing timber, because, owing to the slow growth of trees, he could not net more than three per cent. per annum on his capital. If tree-growing should pay under favorable circumstances ten per cent. or more, then the lumberman† would be more likely to stand the risk of fires.

If there were no fires, and therefore no danger of loss of capital, the lumberman, like any other capitalist, would be satisfied with comparatively low interest, and, like the German forester, would provide for a future crop while harvesting the present crop. In fact, there is no difference between forestry and lumbering; both try to make as much money out of the wood as possible. And as long as ruthless clearing pays ultimately better than any other method, ruthless clearing is the course to adopt from the financial standpoint of forestry. This sounds paradoxical, as Americans are in the habit of considering forestry to be the art of cultivating, using and preserving forests. Such an art, however, is not financial forestry, but merely the development of the principle of forestry under a certain set of circumstances. Where cultivating, using and preserving forests yields the highest money result, as it does abroad, there cultivating, using and preserving forests is economic forestry. Where making a clean sweep yields the highest results, as it has hitherto done in the United States, there making a clean sweep is economic forestry. In a very densely wooded but thinly populated country far away from large markets, as long as the world lasts, mere lumbering will be the consequence of the true principles of forestry. In fact, in such a country ruthless lumbering and forestry are identical. Mr. J. E. Defebaugh, editor of *The Timberman*, Chicago, Illinois, in an interesting address delivered before the World's Fair Congress, comes to the conclusion above indicated, stating, "It is not within the power of the lumberman, under present conditions, to carry out any policy of forest preservation or culture."‡

Now, if the present conditions do not allow economic forestry to preserve forests, and if it is, on the other hand, a vital interest of the state to have the forests preserved, then the conditions must be changed by the state. To compel the lumberman by stringent laws to cut only mature timber, to clean up the debris, to replant the areas cleared, is utterly impracticable.

The change of conditions needed is mainly protection from forest fires by laws strictly enforced by the Government. Protection from forest fires is the essential condition that renders forest preservation and forest regeneration remunerative. With the certainty of their being safe from fire in the future, seedlings and young trees have a value. Now, if it is true that the commonwealth needs forests, then the commonwealth must pay for the change of conditions for the protection of young woods from fire. The owner of the forest, when practically sure that fires will no longer occur, realizes at once that a second growth left on the ground has a value; he will find out that forest preservation and forest regeneration pays, and will therefore try to preserve and regulate his woodlands.

Reduction of taxes on second-growth woodland when

* Besides by fire, young trees are endangered by wind, insects and fungi. However, checking insects and fungi is comparatively easy if the fires are stopped, and wind-breaks can be lessened under proper management.

† The term "lumberman" in the above remarks designates the forest-owner in his capacity of lumberman. The lumberman who buys stumpage from the owner, of course, has not the slightest interest in the preservation or regeneration of forests, neither here nor abroad.

‡ Mr. Defebaugh gives a financial illustration of what he thinks to be forestry. A virgin forest of 100,000 acres of Pine, he assumes, under forest methods, yields 20,000,000 feet per year with a growing stock of 700,000,000. But such forest methods are far from being economic. I would cut, say, 45,000,000 feet annually during fourteen years, thus reducing the investment of capital to a minimum and raising a second growth at the same time, from which, after the lapse of the fourteen years, 20,000,000 feet may be cut annually. An average production of 200 feet per acre per annum with White Pine, if the rotation is fifty to eighty years, is certainly not too high. Compare *Proceedings American Forestry Ass.*, vol. x., page 155.

* These figures are merely meant for illustration, and are not based on any actual data. For the calculation compound interest at five per cent. was taken.

sufficiently stocked might form another inducement toward forest preservation. Here, again, if the state benefits by the existence of woods, it should reward the men who preserve them by refunding or reducing taxes. Such laws will constitute the most important step possible against further decrease of the timbered area. The maintenance of the forest-clad area, in consequence of forest fire and tax legislation, will not, however, do away with the evils already existing. It will not restore the millions of acres which are not only unproductive, but a constant and increasing danger to the lowlands, having lost their capacity of storing up the precipitations, of mitigating atmospheric extremes and conferring health on the neighboring population. There are also vast districts, now more or less heavily timbered, whose mere existence is so beneficial that neither the lumberman nor the forester should be allowed to cut them, as young seedling growth does not act as beneficially on climate, water-supply, etc., as mature woods do. With such forests, found at the headwaters of streams or near large cities, the principles of economic forestry do not hold good, because their value in the economy of mankind is less than their value in the economy of nature. Such forests must be withdrawn from a merely financial treatment, for the sake of the commonwealth. Withdrawal from the usual economic treatment being identical with the withdrawal from ownership by private individuals, their acquisition by the public becomes a necessity.

It would, of course, be absurd to dispense entirely and invariably with the economic use of areas called forest reserves or reservations in America. But, while financial forestry manages the forests with the exclusive view of securing the greatest money return, reservations are meant, in the first instance, to furnish prosperity to the commonwealth or to parts of it, and only such financial profits are expected to be derived from them as are consistent with their main purpose of existence—health-supply, water-supply, protection of lowlands from destruction or deterioration. The value of health, water and protection secured to the commonwealth by forest reservations cannot be exactly measured and expressed in dollars and cents. We may estimate it, however, by calculating what loss the community would incur if it were less healthy, more subject to sudden changes of temperature, possessed of fewer opportunities of refreshment from outdoor life; or, again, what loss the community would suffer from an inadequate supply of water for domestic use, irrigation and navigation; from the destruction of bridges and roads and railroads, farm-lands, houses and human lives by inundations and floods. The principal return from forest reservations is not shown in money gained, but in losses avoided. If the sum of the losses which a given community would annually undergo in consequence of the ruin of a reservation is estimated at \$4,000,000, then the value of the reservation is about \$100,000,000.

Every reservation, apart from its value as a barrier against possible losses, has a value as a source of money returns from the sale of timber, etc. True forest management, in the case of reservations, is that which renders the value of the "barrier against losses" plus the value of the "source of revenue" a maximum. The more a tract of woodland has the quality of a reservation the less will forest management regard strict economic principles in its treatment, and the more necessary becomes its acquisition by the community interested in it.

Biltmore, N. C.

C. A. Schenck.

Foreign Correspondence.

London Letter.

CRINUM SCHIMPERI.—This plant is thriving out-of-doors at Kew under the same conditions as *Crinum Mooreanum*, *C. longiflorum* and the hybrid *C. Powellii*. It may, therefore, be looked upon as another addition to hardy *Crinums*, and as it is a well-marked species with glaucous subdis-

tichous leaves and tall scapes of handsome white flowers, it is likely to become a popular garden plant. It was introduced about ten years ago from the mountains of Abyssinia, where it was first gathered by Schimper, who also found *C. Abyssinicum*, with which *C. Schimperii* was confounded. It is figured in *The Botanical Magazine*, t. 7417. Another species of *Crinum* which has been tested for its hardiness at Kew is *C. Americanum*, a native of the southern United States, but it is too tender for our climate, even when planted in a sheltered position against the south wall of a greenhouse.

LATHYRUS SPLENDENS.—We are delighted with this, the "Pride of California," which has been a beautiful picture of flowers for the last two months and promises to continue in bloom well into the summer. It is as beautiful as any *Pea* I know, as floriferous as a *Scarlet-runner* and as easy to manage when once its requirements are understood. We have it planted in a bed of loam in a sunny, airy greenhouse, with its shoots at first trained on strings within a foot of the roof. The training has, however, ceased and the new luxuriant growth straggles and festoons in all directions, while from every leaf-axil springs an elegant raceme of from four to eight deep crimson flowers. A peculiarity of this species is the production of one or a pair of flowers at the base of the stalk of the raceme, and almost sessile in the axils of the leaves. It is likely to become a popular greenhouse climber now that its merits have been revealed here and its requirements have been hit upon. For the last five years we have tried to grow it in the open air, and have always failed.

RHODODENDRON, MADAME MOSER.—I omitted this new plant from my notes of last week. It is a double-flowered variety of the *Caucasicum* × *arboreum* group, and is apparently dwarf and floriferous. The color of the flowers is deep crimson. This variety is interesting mainly on account of its being the second double-flowered variety of this class of *Rhododendron*, the other being *fastigiata flore-plena*, which is a seedling form of *R. Ponticum*. It is questionable if doubling the flowers of *Rhododendron* would be an improvement, although the double varieties of Indian *Azaleas* are beautiful as *Carnations*. At any rate, the doubling has started, and, no doubt, before long we shall see more of it. The variety under notice has been raised by Monsieur Moser, of Versailles, and it has been awarded a certificate by the Royal Horticultural Society.

OLEARIA MACRODONTA.—While the majority of the New Zealand Daisy-bushes are too tender to bear our severest frosts, several are useful shrubs for outdoor cultivation, *Olearia Haastii* being the most familiar. One of the most distinct and handsome is *O. macrodonta*, which forms a robust shrub in the open and also grows well against a wall. It has woody striate brown stems, freely branched and clothed with evergreen oblong gray-green leaves, silvery on the under side, the margins broken into large irregular teeth; in size and outline they are very similar to those of the common *Holly*. The flowers are borne on short branches in crowded terminal heads six inches in diameter, each flower being half an inch across, pure white, with purplish disk. The Kew plant is now flowering freely. It used to be called *O. dentata*. A figure of it was published in *The Botanical Magazine*, t. 7065.

PHILADELPHUS MEXICANUS.—Although introduced into English gardens more than fifty years ago, this plant has found little favor, probably because of its tenderness compared with the other and more commonly grown species. At Kew it is perfectly happy against the south wall of a greenhouse, and for the past month it has been flowering freely, its fragrant, creamy white, saucer-shaped flowers, nearly two inches across, occurring singly at the ends of the short lateral branchlets, while the leaves are dark green and shining, ovate lanceolate, two inches long, the three principal nerves very conspicuous and the margins dentate. The plant is first-rate in every sense when grown as here described, and I have no doubt that it would prove useful for cultivation in cool houses in the

same way as the *Carpenteria* here noted. It is by far the largest-flowered of all the species of *Philadelphus* in cultivation here.

DENDROMECON RIGIDUM.—We make poor progress with this plant, which is described as a handsome shrub in California and very floriferous. We have it planted against a south wall, a less-sheltered position being uncongenial, but it grows slowly, and is decidedly thin, "a weedy, wiry-looking object," Mr. Gumbleton called it. This gentleman is of opinion that we have not got the true *Dendromecon rigidum*. The flowers are of a rich yellow color, about an inch in diameter and Poppy-like, or, to be exact, like those of the Welsh Poppy, *Meconopsis Cambrica*. Possibly our plants are too small to judge by—they are at present about a foot high—but they have been flowering freely for the past month or more. When discovered by D. Douglas in California, about forty years ago, it was introduced and grown by Messrs. Veitch in their Exeter nursery, where it proved quite hardy. A figure prepared from this introduction represents it as a sturdy bush with straw-colored branches, rigid, lanceolate entire leaves three inches long and flowers two inches across. Are two forms of this species known?

[There is a second species of *Dendromecon*, *D. Horsfordii*, a stout bush, sometimes fifteen feet high, with oval or broadly oblong obtuse leaves and larger flowers. This grows on the California Islands, and is a handsomer plant than the mainland *D. rigidum*, which is always unattractive in habit, with slender erect wiry stems, and hardly worth growing, except as a curiosity.—Ed.]

CARPENTERIA CALIFORNICA.—This plant is not a success in the open air at Kew, and I learn that even in the south of Ireland it does not thrive outside, the leaves turning partially brown and the flowers coming deformed and irregular. But grown under glass it has proved quite satisfactory. In a conservatory at Kew there is a pyramid-shaped shrub of it six feet high with healthy leaves and bearing numerous erect racemes of the purest white saucer-shaped flowers. Mr. Bennett-Poë also grows this plant successfully by planting it in tubs and placing it outside in the summer, removing it into a vinery and keeping it fairly dry on the approach of cold weather. It is one of the most beautiful shrubs we owe to the United States, and that is saying a great deal, but it requires the protection of a greenhouse during winter, and its flowers only come perfect when opened under glass.

MAGNOLIA FUSCATA.—Although comparatively small and dull-colored in its flowers, this Chinese *Magnolia* has long been grown as a garden plant on account of its powerful and delicious fragrance. There is a large bush of it in the large temperate house at Kew, which is nearly always in flower, scenting the whole house at times. A plant is also established on a south-east wall outside, having been there about three years, and it grows and flowers so freely that one begins to wonder if it is not a hardy shrub, after all. At any rate, it is worth a position on such a wall as that described, the odor of its flowers being particularly pleasing. It has withstood all the frost we have had during the last two years, so that one may gauge its hardiness as equal to a minimum temperature of about twenty degrees, Fahrenheit.

London.

W. Watson.

New or Little-known Plants.

Robinsonella, a New Genus of Tree Mallows.*

THE recent collections of Mexican and Central American plants are full of little-known and new species, and even new genera are not uncommon. It is rare, however, to discover a genus of trees, and especially one as attractive as this one.†

* Published by permission of the Secretary, Smithsonian Institution.

† *Robinsonella* Rose & Baker fil., gen. nov. Bractlets at base of calyx, none. Calyx 5-lobed or lobed. Stamens united into a slender column, divided at apex into numerous filaments. Cells of ovary 9 to 13, 1-ovuled; style branches filiform; stigmas capitate. Ovule solitary, hanging; mature carpels much inflated and

In Mr. E. W. Nelson's last collection and the recent distributions of Mr. C. G. Pringle and Captain John Donnell Smith are two undescribed species which, with one heretofore anomalous species generally referred to *Sida*, seem to constitute a new generic type. The species are all small trees or shrubs with large and palmately lobed or veined leaves and large white or pale lilac-colored flowers. Some of the species are very handsome and worthy of cultivation, but since all come from southern countries they can hardly be used outside of greenhouses, although one of them, and perhaps the handsomest, comes from the mountains about Oaxaca, where it was found at an altitude of 7,500 feet.

This new genus belongs to the Mallow family. Its technical characters place it in the subtribe *Sideae* and near the genus *Sida*, from the typical species of which it differs in habit, in color and size of flowers, and especially in the character of its carpels.

The differences in the carpels are several and very important. While in both genera the ovules are solitary and pendulous in the young carpels, in the new genus the upper part of the carpel rapidly develops, leaving the seed at the base, which thus appears as if it originated at the base, and in, at least, one of the species the attachment is so low that the free end of the seed is pushed up and becomes erect. The carpels are much inflated, of thin papery texture throughout, never reticulated, obtuse at apex, and do not in the least suggest a *Sida*. They are tardily dehiscent, seeming to split from the base up along the back; the seed often hangs by a slender thread which runs along its back the full length of the carpel. The calyx is much smaller than the fruit, the sepals never connivent or enclosing it, as in *Sida*, but more or less open, or even reflexed.

The genus as we now understand it is composed of five species, two of which are Mexican, one Central American and two South American.

We take pleasure in dedicating this genus to Dr. B. L. Robinson, the Curator of the Gray Herbarium, whose contributions to American botany deserve to be commemorated in this beautiful genus of Tree Mallows. The species as we understand them are the following:

Robinsonella cordata.* (See figure 31, page 246). The collection of this tree by both Mr. Nelson and Mr. Pringle in 1895 first led to our recognizing the new genus. The species is, perhaps, the handsomest of the group. It must, however, be very rare, which, perhaps, accounts for its having been overlooked by previous collectors. Mr. Pringle wrote, under date of March 15, 1897, as follows: "I saw only two plants. One was a shrubby plant on the rocky bluff of a cañon (and only seen from the railroad train), the other was the tree, about twenty-five feet high, from which I took specimens, then coming into flower. I got nothing to show the character of the fruit. I climbed into the top of this tree, and remember it as of upright habit with a trunk of about a foot. It cannot be abundant in the vicinity of Oaxaca, for I traveled thereabouts extensively and saw only the single specimen growing on the slope of the Sierra de San Felipe, some seven miles above that city."

spreading, united only at the base, obtuse at the apex, and perhaps tardily dehiscent; seed 1, attached near the bottom of the mature carpel, appearing as if coming from the base, and filling only a small part of it.

Shrubs or small trees. Leaves palmately lobed or veined. Flowers large, white or pale lilac.

* *Robinsonella cordata*, Rose & Baker, sp. nov. Trees 15 to 25 feet high, much branched; branches with dark gray wrinkled bark, pubescent, tardily becoming glabrate; mature leaves broadly ovate with cordate base, simple, acuminate, 5 to 7 nerved, slightly crenate, nearly glabrous above, paler and softly pubescent beneath, 3 to 4 inches long, 1½ to 3 inches wide; petioles 1 to 1½ inches long, villous pubescent; flowers borne in the axils of the old leaves in small clusters of 3 to 5 on short peduncles; pedicels slender and weak, 5 to 10 lines long, jointed near the middle, clothed with short stellate pubescence and with longer simple hairs; calyx deeply 5-parted, densely stellate, with or without villous hairs; flowers 2 inches in diameter, pale lilac; styles 12 to 13; stigmas capitate; carpels 12 to 13, distinct nearly to the base, somewhat inflated, obtuse, thin, stellate, one-seeded; seed glabrous, filling but a small part of the carpel.

Collected by Mr. E. W. Nelson near Tamazulapam, State of Oaxaca, Mexico, altitude 6,500 to 7,000 feet, November 16, 1894 (No. 1955), and also by Mr. Pringle on the Sierra de San Felipe, altitude 7,500 feet, 1895 (No. 6244). Distributed as *Malva subtriflora*.

Robinsonella divergens.^{*} (See figure 32, page 247). This species is a small tree eighteen feet high. It will be found in many herbaria under the name of *Sida Lindeniana*, from which, however, it is wholly distinct. *R. divergens* is confined to Central America, and differs from the above in its leaves, flowers and carpels. It appears to be very common in Central America and Guatemala.

Robinsonella Lindeniana.[†] This species is described as a shrub, but we know very little regarding it. It seems to be confined to the low land of Mexico, being reported from the state of Vera Cruz and the valley of Cordova. It cannot be widely distributed, for Mr. Pringle, who has traveled so extensively in Mexico, has never met with it. It has been collected, however, by Linden, Galeotti, Bourgeau and Botteri. The specimens of the latter two collectors are represented in the United States National Herbarium. *R. Lindeniana* has always seemed to us to be anomalous in *Sida*. It was first studied by Turczaninow (in 1858), who described it under three different names in the same paper—twice as *Sida* and once as an *Abutilon*. The flowering specimens were referred to *Sida*, while the fruiting one was placed in *Abutilon*. The carpel much resembles those of *Abutilon*, but differs in having one ovule instead of several. Dr. Gray, in his revision of our United States species in 1887, constructed a separate section in *Sida* for this species in these words: "Abutilastrum is a name quite appropriate for another section, namely, for *Sida Lindeniana*, which would be essentially an *Abutilon* of the section *Gayoides*, except for the uniovulate carpels."

This view was taken by Mr. Baker in his recent Revision of *Malvaceæ* in the *Journal of Botany*, where he added several species to the section. A good illustration of this species may be found in Hemsley's *Biologia Centrali-Americana*, t. 9. It differs from *Robinsonella divergens* in having, perhaps, larger leaves, with the pubescence on the under surface very soft and villous, the inflorescence more open, with more slender and longer pedicels, the sepals broader, the flowers smaller and white instead of blue, and the carpels more compact, etc.

Sida lepidota (*Fr. Muell. Frag.*, vi., p. 168), from Australia, differs in habit from the members of this genus; the leaves are small and orbicular, the structure of the carpels is, however, somewhat similar, being inflated, globose and one-seeded and the seed pendulous. It appears to be an ally of some of the globose-fruited species of *Abutilon*, such as *A. graveolens*, W. & A., differing, of course, technically in the number of ovules.

Sida densiflora (Hook. & Arn., *Bot. Misc.*, iii., 155) was first described from Borgia in the Missions, where it was collected by Baird. It is said to be a beautiful tree, and the type is in the Kew Herbarium. This plant is closely allied to *S. myriantha*, Pl. & Lind.; both species are much smaller-flowered than *Robinsonella cordata*, *R. divergens* and *R. Lindeniana*, and according to Dr. K. Schumann (*Fl. Brasil*, XII., pt. iii., p. 287) *S. densiflora* differs considerably from them in the structure of the carpels, while *S. myriantha*, Pl. & Lind., so far as we are aware, has not yet been collected in fruit.

Dr. Schumann, l. c., p. 280, makes a section of *Sida* for

^{*} *Robinsonella divergens*, Baker & Rose, sp. nov. A small tree 18 feet high; lower leaves 3-lobed, 6 to 8 inches long, including the petiole (2 to 3 inches long), acute, serrate, cordate at base; upper leaves lanceolate, simple, slightly serrate or entire, somewhat scabrous above, short stellate-pubescent beneath; inflorescence cymose-paniculate; pedicels short, 2 to 6 lines long; calyx deeply 5-cleft; sepals lanceolate, 2½ to 3 lines long, acute, reflexed in fruit; carpels 9 or 10, strongly spreading and widely separated at apex, the summit wing-like.

Specimens examined. Costa Rica: San José, John Donnell Smith, April, 1894 (No. 4751); San José, Tonduz, February, 1893 (No. 7311), and November, 1880 (No. 1452); San José, H. Pittier, December, 1893 (No. 8471); San Rafael, H. Pittier, June, 1890 (No. 2600); San Rafael, Tonduz, February 13, 1890 (No. 1977). Guatemala: Santa Rosa, Heyde & Lux, November, 1893 (No. 6299); Santa Rosa, Heyde & Lux, January, 1893 (No. 4326).

[†] *Robinsonella Lindeniana* (Turcz.), Rose & Baker; *Sida Lindeniana* (Turcz.), *Bull. Soc. Nat. Mosc.*, 31: pt. 1, 200 (1858); *S. Ghiesbreghtiana*, Turcz. l. c.; *Abutilon* (?) *ambiguum*, (Turcz.), l. c., 205. Shrub; lower leaves large and palmate-lobed, the upper three-lobed above; dark green, somewhat scabrous beneath; pale, densely and softly stellate-pubescent; lobes entire or more or less dentate, four to six inches in diameter on petioles as long or longer; inflorescence ample, cymose-paniculate, its branches and pedicels slender; pedicels six to twelve lines long, jointed a little below the flower; calyx five-lobed; sepals broadly ovate, acute or obtusish, two lines or less long; corolla white; carpels eleven to thirteen, inflated, four to five lines long, somewhat compact. State of Vera Cruz and Valley of Cordova.

S. densiflora, H. & A., calling it *Bastardiopsis* and characterizing it as follows: "Flores gynodioeci, i. e., plurimi post anthesin caduci; carpidia longe caudata, caudis flexuosis pilosis carpidiis pluries longioribus, dorso et ventre dehiscencia, contigua tardius soluta."

Sida densiflora, H. & A., differs from *S. myriantha*, Pl. & Lind., in having the calyx externally much more densely cinereo-tomentose and in having a much longer staminal column. It comes from Brazil (Minas Geraes and St. Paulo), and from Paraguay.

Sida myriantha, Planch. & Linden, ex. Tr. & Pl. in *Ann. Sc. Nat. Sér.*, iv., xvii. (1862), p. 179, comes from New Granada, the localities given by the authors being "Prov. Ocana, Schlim, No. 359" and "Onebrada de los Corales," Gondot. It is in the British Museum Herbarium, from Prov. Ocaña, Schlim, No. 376.

In our study of this genus we have had access to the material at Kew, in the Gray Herbarium and in Captain John Donnell Smith's Herbarium, as well as that of the British Museum, and in the United States National Herbarium.

J. N. Rose and E. G. Baker.

Cultural Department.

Chrysanthemum Notes.

CHRYSANTHEMUMS intended for specimen plants should be making rapid growth now, and stopping must be continued regularly; a shoot overgrown, and then topped, breaks badly. Varieties like Garza, W. H. Lincoln and Glory of the Pacific make good plants with little training. Others are difficult to manage, no matter how much care is used to get them into shape, and some of the choicest kinds are unruly in this respect. It is seldom, out of a dozen novelties, that more than one or two are found useful for bush specimens. New varieties may be tried, but they should not be relied upon; though the color and form of the flowers may be entirely satisfactory, the habit of the plant may be undesirable.

We continue stopping through the greater part of July, and even in August, if we find any shoots getting away. No rule can be made for either early or late varieties, and the cultivator must become acquainted with the different kinds to be able to judge in respect to stopping. Many early varieties break poorly; strong-growing and stocky varieties, as G. W. Childs and Minerva, almost always do so. As these generally make good-sized flowers on smaller stems, we continue to pinch them back until August. Others, such as Ivory, G. Daniels, Arethusa and W. H. Lincoln, are naturally bushy, and need little attention at any time. Later varieties, as John Shrimpton, S. T. Murdock and all those that come best on an intermediate bud, or second crown, like Crystallina, G. Pitcher, Golden Hair and Clinton Chapant, must be let alone after the middle of July.

Yellow thrips are more troublesome than usual. As a remedy I use whale-oil soap—one pound to ten gallons of water, with an infusion of tobacco and a pound of sulphur. This pest is hard to kill, but by continued application we expect to get rid of it. The soot of bituminous coal, used in place of sulphur, was effectively used.

Plants intended to be grown for exhibition blooms to a single stem should be planted during the month of June. July will be early enough to plant for commercial and decorative purposes. Not less than nine inches each way should be allowed for exhibition blooms. For decorative purposes and later planting six inches apart will do. The heights and colors of the flowers may be arranged to harmonize effectively.

Wellesley, Mass.

T. D. Hatfield.

More June Irises.

THERE are other Iris species interesting in the garden in early June besides the Spanish varieties. The most stately one and among the tallest of Irises is *I. ochroleuca*, which flowers at a height of four feet. The blooms are pure white, with orange-yellow markings. The claws are long, falls obovate, and standards not very prominent. Each stem usually bears four flowers opening in succession. This Iris is also grown as *I. gigantea*, but according to precedence it should be known as *I. orientalis*. *I. Kerneriana*, collected near Smyrna, for which I am indebted to Mr. Whittall, is supposed to be the wild form of *I. ochroleuca*, and differs from this well-known Iris only in being narrower in all its parts, the leaves as well



Fig. 31.—*Robinsonella cordata*.—See page 244.

1. A flowering branch, natural size. 2. A leafy branch, natural size. 3. A fruit, natural size. 4. Vertical section of flower, enlarged.
 5. Vertical section of an ovary, enlarged. 6. Portion of a fruit, showing vertical section of one carpel, enlarged.



Fig. 32.—*Robinsonella divergens*.—See page 244.

1. A flowering branch, natural size.

2. Vertical section of a flower, enlarged.

3. A fruit, natural size.

4. Vertical section of a fruit, enlarged.

5. Vertical section of a seed, enlarged.

6. An embryo, enlarged.

as petals. Irises are not much affected by insects, but the nectar of *I. ochroleuca* seems to be very attractive to black ants, some of which will always be found busily engaged on the flowers.

Early June is also the flowering-season of some of our native Irises. The light purple flowers of *I. prismatica* (*Virginica*) appear in our meadows at this time, and the small flowers with grass-like foliage are attractive in the garden. This Iris is a sturdy grower and can hold its own among the thickest grasses. Like our other common but larger "Blue Flag," it grows equally well in wet or dry places. Some ten years ago Mr. W. A. Manda found, near Wilmington, North Carolina, a new "Blue Flag," which had hitherto escaped the notice of the botanists. This is an attractive species, with lax foliage, brown spathe valves and light purple flowers. It has since been found as far north as Bordentown, New Jersey. One of our quaintest and most distinct Irises is *I. fulva*, or *cuprea*, which is a southern species, but perfectly hardy here. This has drooping petals of a terra cotta color quite distinct from any other Iris known.

Among all the tall native Irises, however, we could safely give the palm to *I. hexagona*, the best varieties of which are attractive in form and coloring, bold in size of flower and distinct in habit. It seems to have a wide range, and I have had it from as far west as Idaho and as far south as Florida. It forms thick rhizomes sometimes two feet long, and flowers freely on stems with several heads and several large leaves. These stems are partly prostrate at flowering-time, and the effect is that of a shower bouquet of rich blue flowers with greenish white centres. The best variety which I have seen is that collected in Arkansas by Mrs. La Mance and which bears her name. Besides this, I have varieties with light coloring, and one with an intermediate shade of purple. My friend, Mr. Mead, found in a Florida swamp a pure white variety, but this has not yet been proven to be hardy here, although there seems to be no reason why it should not be. The type is reliably hardy with no protection, and the white variety is evidently only a sport, as seedlings mostly revert to the type. Another winter with plants better established will test the variety more fully.

Elizabeth, N. J.

J. N. Gerard.

Strawberries under Glass.

AN attempt was made last winter at growing Strawberries under glass in Cornell University, and some details of the experiment are given in a late bulletin prepared by Mr. C. E. Hunn and Professor Bailey. The cloudy climate of Ithaca, where there was not a full day of clear sunshine during the months of December or January, the lack of well-established plants of suitable varieties, and the fact that the only houses available were too high and too dark for the best growth of the crop were serious drawbacks, and yet the success achieved was so considerable that we feel warranted in presenting in a condensed form the main features of the practice adopted:

The plants from which runners were taken were set in rich ground on the 6th of May, but the season was so dry that they made small growth. It is probable that the best results could be expected from the runners of maiden plants set early in the spring or in the autumn before. In these experiments the first lot of plants were grown in two-inch pots plunged under the runners on the 10th of July, the second lot on the 27th of July, and the third on the 22d of August. After growing in the pots for two weeks the plants were shifted into four-inch pots and put in cold frames upon which no glass was placed until very cold weather. They were shifted on into five-inch and finally into six-inch pots and brought into the forcing-houses in succession and carried through to fruiting. The plants remained out-of-doors until nearly midwinter, with no protection except the glass covering, so as to give them a thorough rest by allowing them to freeze perfectly solid. Perhaps this freezing is not essential. Indeed, it is probable that the berries can be raised as well without it, and yet it is believed that a decided check should be given to the plants before they are taken into the houses, and the freezing may help to destroy the red spider and other pests.

Four hundred and fifty pots of the first lot were brought, on the 21st of December, into a house with a temperature of forty to forty-five degrees at night. Dead and diseased leaves were trimmed away, and on the 6th of January the young leaves began to appear freely. The plants were sprayed with ammoniacal carbonate of copper as soon as the first spot of rust appeared, and the house was vaporized at intervals with extract

of tobacco to keep down insects. Many plants were in flower on the 1st of February, and nine days later they were staged near the glass at a temperature of sixty-five degrees at night. The berries were well colored by the 6th of March, and on the 11th the first pickings sold for \$2.00 a quart in Ithaca. The crop continued for about ten days. Most of the plants were of the Beder Wood variety, and although they began to flower when the foliage was very small and scanty there seemed to be enough to carry the plants to maturity. The stamens did not develop strongly in cloudy weather and there was some difficulty in getting enough pollen. The Beder Wood is a perfect-flowered variety, but it only produces enough pollen to fertilize its own flowers. The pollen was transferred every bright day by means of a brush rubbed over the anthers and again over the pistils. The operator always carried a little spoon-like implement made of a watch crystal glued to the end of a small ladle, and whenever any flower contained a superabundance of pollen the dust was shaken into this receptacle for flowers where the pollen was deficient. This process was repeated every clear day, for, as in the case of Tomatoes and other forced plants, the pollen is discharged most freely when the sun is bright and the house is dry. It is essential to pollinate every flower completely, for if one side of the pistils is left unfertilized that side of the berry will fail to develop. After the berries were well set, on the 19th of February, a little manure-water was given, and repeated until the berries were about full-grown. The surface of the pots was at first covered with sphagnum moss to hold the berries from the earth, but two or three days of dull weather brought on indications of rot, and the moss was removed. Some of the pots were then covered with cork-dust, such as is used in packing foreign grapes, which answered the purpose well, but the most successful device was the use of small pieces of wire screen, which kept the berries away from the earth and showed them off to the best advantage.

The second and third lots contained some plants of the Sharpless, Van Deman and a few of Hunn, but the Beder Wood proved the best variety. One of its peculiarities is the small amount of its foliage and the greater prominence of the fruit on this account. The light color of the berries is against it, but it has the advantage of being very early. Hunn is the handsomest berry tested, being large and dark-colored, but it is too late for profitable forcing. The plants of Beder Wood set from eight to twelve berries each, but when small and imperfect ones were removed about six first-class uniform fruits were the average on each plant in the whole lot of four hundred. With stronger plants no doubt eight fruits could be averaged. Because the pots are set so close together it is possible to secure a larger yield to the square foot under glass than is obtained in the field—that is, a quart can be grown on from two to three square feet of floor-space, and allowing for walks and other waste, the yield would figure up to four hundred bushels to the acre.

The bulletin gives the following summary of points which should be especially noticed in the cultivation of Strawberries under glass: (1) Very strong plants to begin with, which have been kept in vigorous growth and not allowed to become pot-bound until they have reached six-inch pots. (2) Varieties which are early, or, at least, not later than midseason, and preferably those which themselves produce an abundance of pollen. (3) The exercise of great care to have the plants free of fungous diseases and insects before they are put upon the benches. (4) The devoting of an entire house to the crop. If two or three different crops are grown in the same house none of them can receive the very best treatment which they demand; and if there are other plants in the house which are infested with red spider, the pests will spread to the Strawberries, and it is very difficult to dislodge them without keeping the plants so wet that pollination is interfered with and rot threatened. (5) Growing the plants as close to the glass as possible. (6) In the dull months constant and careful attention to hand pollination. (7) Liberal applications of liquid-manure two or three times a week after the fruits have begun to swell. (8) Exercise of care that the berries do not lie directly upon the soil or upon a wet surface.

Asparagus SprengerL.—This plant has not only all the merits noted by Mr. Orpet, but is also a very decorative and useful house plant either in a suspended basket or placed on a standard or pillar, which its profuse sprays of foliage will soon cover. It is a clean plant with a distinct effect, and only requires, like most plants devoted to domestic use, a certain acclimation; after which it endures well the modern house conditions of light and heat and requires no special skilled

attention. Mr. A. Blanc is entitled, I believe, to the credit of introducing this plant in the United States.

Elizabeth, N. J.

J. N. G.

Correspondence.

Fir-tree Oil as an Insecticide.

To the Editor of GARDEN AND FOREST:

Sir,—The following notes upon the use of Fir-tree oil against certain insects not readily amenable to insecticides, may interest some of your readers. For the past two years hardy Roses in this neighborhood have suffered severely from the attacks of at least three insects: first, a species of aphid, or plant-louse, which swarms upon the tender new growth and upon the flower-buds; secondly, the larvæ of one or more species of moths belonging to the genus *Cacoecia*, which damage the foliage and flower-buds; and lastly the leaf-hopper, a small, white, winged insect which lives upon the under surface of the leaves, sucks the juices, and thereby causes irregular white spots upon the upper surface of the leaves.

The damp weather and frequent rains of May induced a rapid growth of succulent tissue, and early in the month the aphides appeared upon Roses in enormous numbers. Attempts were made to eradicate the pest by crushing, but the survival of two or three individuals was sufficient to infest the plants completely in a day or two. About the middle of May the worms began to appear, one kind, of the "inch-worm" type, from half to three-quarters of an inch in length, and attacking the leaves principally; the other a trifle larger, grass-green, with a black head, and usually found neatly ensconced in a rolled-up leaf, whence it emerges and attacks the flower-buds, gnawing out the inside completely. Upon being disturbed, this larva becomes extremely active, writhing about on the palm of the hand or wriggling quickly from the leaf and dropping to the ground. Last year I dusted the Roses thoroughly with hellebore, naturally with no effect upon the aphides, but, to my surprise, with very little effect upon the worms. This year I have tried spraying the plants with two insecticides, both separate and combined, with entirely satisfactory results—at least in the case of one of them. Upon a large Queen of the Prairie Rose I used a decoction of tobacco made by steeping one pound of tobacco waste in two gallons of hot water. This was used while still warm, and was applied by means of a small force-pump attached to a pail and provided with a Vermorel nozzle. Upon this plant the aphides alone were present, but in very great numbers. The first treatment resulted in the death of about fifty per cent. of the insects, and it was repeated a week later. These two treatments, however, have not proved sufficient or wholly satisfactory.

To two gallons of the tobacco decoction, made as described above, I then added a quarter of a pint of Fir-tree oil, and with this I sprayed six large plants of Polyantha Roses. These plants were covered with buds, had produced an abundance of tender shoots, and were badly infested with aphid and with the green larvæ mentioned above. A careful examination of the plants on the day following the treatment showed that fully ninety per cent. of the aphides had succumbed, while upon the six plants only two or three living larvæ were found, the liquid having penetrated the folded leaves and killed the larvæ within the fold. A spray consisting of a quarter of a pint of Fir-tree oil in two gallons of clear water produced a like beneficial effect upon six other Polyantha Roses, and in neither case did the application result in any damage to the most tender tissues. This experience confirmed what I had previously known regarding the value of Fir-tree oil as an insecticide. A spray or wash made of half a pint of the oil in two gallons of water completely destroys the scale insect so detrimental to Orange-trees grown in the house or under glass. A single treatment causes the scales to become brown and dry, so that, if desired, they may be gently wiped from the plant. Against woolly aphid upon plants in the greenhouse, Fir-tree oil has proved invaluable. This substance is expensive (seventy-five cents a pint at retail), but a little goes a long way, and the odor, by no means unpleasant even in the house, is soon dissipated.

I am aware that a suds made of whale-oil soap, or even of common soap, has often been pronounced "as good as anything" against aphides, but for general utility, thorough effectiveness, ease of application and cleanliness, I know of nothing which equals Fir-tree oil. It is to be hoped that an increased demand will lower the price of this substance, so that its value may become more generally appreciated.

New Haven, Ct.

W. C. Sturgis.

Pokeweed as a Vegetable.

To the Editor of GARDEN AND FOREST:

Sir,—Mr. Chamberlin's list of wild plants which are used as "greens" in the various parts of the country (see page 239) might be considerably extended. It seems rather remarkable, however, to a resident of this city that Pokeweed, *Phytolacca decandra*, should have been omitted, especially since Milk-weed is mentioned as a substitute for Asparagus. The young shoots of the Pokeweed are not at all uncommon in our markets and on our sidewalk stands, and when cooked like Asparagus they are very tender and have a flavor that is highly relished by many people who flatter themselves that their palates are not uneducated.

Philadelphia, Pa.

J. R.

Exhibitions.

Flower Show in New York City Hall.

THE New York Gardeners' Society, by permission of the Mayor and Aldermen of the city, held a flower show on Saturday last in the Aldermen's Chamber of the City Hall. The society consists mainly of private gardeners, and they certainly brought together one of the most interesting and varied exhibitions of flowers ever seen in this city. The Roses, of course, were in great abundance at this season, and standard varieties of all classes were shown in first-rate form. Among the newer ones were Bardon Job in the collection of Hicks Arnold, a large semi-double cup-shaped flower of a singularly rich crimson color, and Mr. W. A. Manda's hybrids between *Rosa Wichuraiana*, and certain Tea Roses like *Perle des Jardins* and *Madame Hoste*. These flowers have the true Tea fragrance and the plants have evergreen leaves. Mr. Manda also showed hybrids between *Rosa Wichuraiana* and the Hybrid Perpetuals. There were fine cut flowers of *Odontoglossums* and *Cattleyas*, and a magnificent plant of *Cattleya guttata*. The Japanese *Hemerocallis aurantiaca* was shown in first-rate form, and its rich color and large size make it a welcome addition to this beautiful genus. A new snow-white *Carnation* of fine form and fragrance, and on long stout stems and called *Greater New York*, was much admired. In the collection of Mr. John Lewis Childs a vase of the spikes of *Lilium tenuifolium* and another of the rare *L. Parryi* were exhibited, but to specify all the good flowers seen would be to give a catalogue of everything in bloom at this season. A few belated German *Irises* and a few early Japanese *Irises* were mingled with a great abundance of Spanish *Irises* now at their best, *Gaillardias*, named *Pyrethrums*, a *Coreopsis*, which by crossing or selection is distinct enough to deserve the name of *Harvest Moon*, *Delphiniums* of every shade of blue, masses of *Heuchera sanguinea*, upright *Clematises*, *Thermopsis Caroliniana*, beautiful strains of *Aquilegia*, *Centranthus*, the best new Sweet Peas, *Scabiosa Caucasica*, new *Pæonies*, single and double, with *Canterbury Bells*, *Sweet Williams*, *Foxgloves*, *Centaureas* and many other old-fashioned flowers. Besides these there was a good collection of fruit and vegetables. The exhibition was a credit to the gardeners of this vicinity on account of its quality, and they deserve the thanks which the Mayor gave them in a graceful speech, not only for making a free display at this busy season, but because they gave all the flowers to poor children, the inmates of city hospitals and others who have few opportunities to enjoy beauty of this sort.

The principal prizes were taken by G. Reilly, gardener of William Brown; A. Herrington, gardener of H. McK. Twombly; Richard Sherry, gardener of George W. Bramhall; F. Mongold, gardener of Miss Helen Gould; A. Taaffe, gardener of Miss Mathieson; A. Grierson, gardener of Hicks Arnold; William Anderson, gardener of J. M. Constable; A. J. Wengerten, gardener of Cornelius N. Bliss; William Scott, gardener of Mrs. T. Eastman; A. L. Marshall, gardener of J. B. Dutcher; A. L. Brill, gardener of Miss Monahan; Robert Marks, gardener of Mrs. De La Vergne; W. Barthelme, gardener of W. B. Isham; O. E. Owens, gardener of M. Crawford; James Kirby, gardener of Mrs. S. D. Ripley; John G. Aitkins, gardener of M. R. Cook; W. H. Harvey, gardener of Obert Parks; Job Ash, gardener of Miss E. J. Clark; F. R. Poirkovsky, gardener of Mrs. Reynal.

Notes.

The destruction of the forests which has been going on about the diamond mines near Kimberley, South Africa, is believed by Dr. William Crookes to have seriously modified the climate. The country within a radius of a hundred miles has been stripped of wood to supply timber for the mines.

The forests were barriers against the wind; they tempered the heat of the sun in a region where the air is extremely dry, and their removal is thought to account for the dust storms which have been so frequent in that country this year.

Professor N. E. Hansen, Horticulturist of the United States Experiment Station of South Dakota, at Brookings, was recently appointed a special agent by the Secretary of Agriculture to visit eastern Russia, Siberia, and the elevated plateaus of central Asia, to gather garden, farm, fruit, shrub and tree seeds. Professor Hansen states that the few plants from this dry inland European region already tested in South Dakota, Manitoba and the north-west territory have proved hardy, and it is his intention to collect during the present summer and autumn as complete a representation of the plants of that region as possible.

In some places anthracnose of the Black Raspberry has been so prevalent and virulent as to warrant the special study which has been made at the Geneva Experiment Station in this state, and a late bulletin suggests the following measures of prevention and cure: Use only healthy plants and adopt a short rotation of crops. Protect the new shoots in spring by spraying with Bordeaux mixture when they are about six inches high, or spray for the first time when the first few spots appear on the young canes. This should be followed by two or more other sprayings at intervals of ten or fourteen days. Old canes and badly diseased new ones should be removed as soon as the fruiting season is over.

The sixty-sixth fair of the American Institute of this city will be held in Madison Square Garden, September 20th to November 4th. The exhibition of the agricultural and horticultural department will continue from September 27th to October 23d, in the Concert Hall, and will comprise plants, flowers, fruits, vegetables and cereals. No entrance fee is required for exhibits in this department, and there are classes open to amateur and to commercial growers. An interesting feature will be the display of vegetables grown on vacant-lot farms. Those who intend to exhibit in any of the classes of this department are requested to notify Dr. F. M. Hexamer, No. 52 Lafayette Place, New York.

The first new apples, green and small, came from North Carolina last week. Niagara grapes, from Florida, are already offered here, a three-pound basket of large-berried attractive bunches costing forty-five cents. Other new-crop fruits are currants and black and red raspberries from Maryland, Delaware and New Jersey. Watermelons and muskmelons are now of good size and flavor and sell readily. Choice English gooseberries of immense size bring twenty cents a quart. Nectarines, from California, large and showy, cost fifty cents a dozen, and new grape-fruit, from Jamaica, twenty-five cents apiece. Forty-four car-loads of California fruits were sold here last week. Lemons have advanced \$1.00 a box during the past ten days, in anticipation of warmer weather.

At the Annandale Rose Show, held last week under the auspices of the Dutchess County Horticultural Society, one of the leading features was a collection of Orchids, Crotons and greenhouse plants from the Dinsmore estate (Mr. Thomas Emerson, gardener), and Gloxinias from Archibald Rogers, Esq. (Mr. James Horrocks, gardener). The principal prize-winners were Wallace Gomersall, gardener to Winthrop Sargent, Esq., who took the silver cup for the best twenty-four distinct varieties of Roses; Mr. Richard Lewis, gardener to Miss Cruger, who won the society's prize for the best collection of outdoor Roses, and Thomas Harrison, gardener to Ex-Governor Morton, for Roses in various classes. Miss Cruger's exhibit of vegetables and Ex-Governor Morton's strawberries were exceptionally good.

The early blight of Celery is sometimes very destructive in the hot midsummer weather, and when the young plants are set out it is advisable to dip the leaves in some fungicide, the ammoniacal copper carbonate solution being most promising so far as known. The formula generally used is eight ounces of copper carbonate and three pounds of ammonia water (26°) added to forty-five gallons of water. In fields where the disease has prevailed in previous years many of the spores have undoubtedly been carried over during the winter, and it is best not to wait until the spots appear. If the plants should be sprayed at intervals of two weeks with the same solution, or one a trifle weaker, the disease may probably be prevented. Dry sulphur has been used with considerable success at the experiment station in New Hampshire, dusted on the plants at the rate of one pound to six hundred plants. It

should be remembered that this disease, *Cercospora Apii*, is quite distinct from the late blight which begins before the other fungus has completed its work and continues its activity even after the crop has been stored.

Among the latest teachers' leaflets which are intended to help on "nature study" in the common schools of the state of New York, and prepared by the College of Agriculture of Cornell University, are two relating to insects, by Anna Bottsford Comstock. One of these is entitled "Some Tent-makers," and it contains suggestions for lessons in the life of the Apple-tree tent caterpillar, commencing with its eggs, and then explaining how to watch the caterpillars as they shed their skins, make their cocoons, etc. Another leaflet gives hints about making collections of insects. The directions are very practical, and in the hands of a skillful teacher they can undoubtedly be made of great use in training the mind and eye of pupils while young and receptive to habits which will be of inestimable value to them later in life.

Many volumes of conjecture have been written about the influence of woodlands upon climate, and especially upon the influence of forest areas on the humidity of the air, but authentic data are still needed. We are glad, therefore, that a series of observations upon this point has been instituted by Professor Corbett, of the South Dakota Agricultural College. A set of hygrometric and other instruments was placed in an open cultivated prairie some four hundred feet from the edge of a grove fifteen acres in extent, and another one was placed within the grove. Practically these fifteen acres are only a grove in embryo, since the Box Elder, Cherry, Maple and Scotch Pine trees of which it consists have only been planted six years. Without going into details of temperature at the surface and below the surface of the soil we can only say that the average daily humidity reported in the open prairie during six months, as ranging from sixty-two to seventy-four per cent., was less than the daily mean humidity in the so-called forest by from two per cent. to ten per cent. This would seem to indicate that the influence of trees is felt in some ways long before they are fully grown.

String-beans, estimated by the number of packages, seem to be among the most popular vegetables, for, besides 25,471 boxes of unclassified vegetables sold in the New York markets, and which included some beans, nearly 25,000 packages of green and wax beans were received here last week from states between New Jersey and North Carolina. Other vegetables handled in large quantity were cabbage, of which more than 16,000 packages reached our markets last week, and there were even more cucumbers. Tomatoes, firm and of good quality, are now coming from Florida, Mississippi and Georgia; large new onions, from Louisiana, Maryland, Virginia and Delaware; besides cabbage from the south, considerable quantities are brought from New Jersey and Long Island, as are peas and asparagus. Eggplants, Yellow Marrow, Crookneck and scalloped squashes, turnips, cauliflower, kohlrabi, beets, radishes, carrots, okra, peppers, garlic, celery, rhubarb, mushrooms, Romaine and other lettuces are all seen, well-grown and fresh-looking, from near-by and remote states. Almost 60,000 barrels of new southern potatoes were consigned to this city last week, many from as far north as Virginia, and old potatoes are still plentiful.

At the meeting of the American Institute Farmers' Club on June 8th, Mr. T. J. Dwyer, in the course of an interesting address on Strawberries, said that he considered Marshall, Brandywine and Parker Earle the three leading varieties of the time, not for any specially favored locality, but for cultivation over a wide range of country. The plants of Marshall are luxuriant and healthy, with dark, rich foliage, perfect flowers and large handsome, uniform fruit of the highest flavor, of dark rich color and no white point. It is a firm shipping berry, ripening early and continuing in good form until late, its season covering almost an entire month. Brandywine is also a strong grower with fine foliage. It is very productive; the fruit averages nearly as large as that of Sharpless and retains its size from midseason until late. The flavor is not the very best, although it is fair, and the fruit is firm and of good shape. The fruit of Parker Earle is firm, light red, with a short neck and about the same size as the old Charles Downing. The plants have a tendency to make very large stools, so that a single plant not infrequently yields two and three hundred blossoms and berries. Of course, so prolific a variety needs a great amount of food, and when abundant water and fertilizing material are provided this is a highly profitable berry for market.

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Natural Beauty in Urban Parks.

WHETHER our appreciation of the beauty of natural scenery becomes profounder and more sympathetic with what we fondly term the advance of civilization is a subject which it is not our purpose here to discuss, although volumes have been written on the question. What we do know beyond dispute is that men and women of refined taste always feel something like indignation when they see natural beauty needlessly defaced. It is this sentiment which moved the Prime Minister of England a few years ago to advocate an act of Parliament to protect the scenery of Great Britain from vulgarization by the paint-pot of the advertiser, which impelled the Massachusetts Legislature to pass a law making it unlawful to proclaim in staring characters the virtues of a patent medicine, and which has clothed the Park Board of this city with authority over signs erected within three hundred feet of the public grounds in this city. The same feeling impelled Mr. Charles Eliot, seven or eight years ago, and his co-workers not only to make an organized effort to protect beautiful scenery from disfigurement, but to secure it as a possession of the people forever. To serve this end the Board of Trustees of Public Reservations was founded, which has been the model for many other organizations of this sort. No one can doubt, too, that the great majority of the enlightened people of Greater New York feel that somehow their personal rights are invaded by the disfigurement of the Palisades which is now going on, and there can be no question that the Legislature of this state never passed an act more thoroughly in accord with the sentiment of the whole people than the one which set apart Niagara Falls as a reservation to be the property of all the people. The National Government has recognized the same sentiment in not permitting Yosemite Valley and the Yellowstone region to pass into the hands of individuals as private property, but has taken these two great national wonders, as well as certain Sequoia groves, and held them permanently for public enjoyment.

In regard to places so noteworthy for sublimity or features of unique beauty there seems to be a feeling that these, at least, are the common heritage of all the people, and it runs counter to our innate sense of right that

great mountain peaks or natural objects of commanding grandeur should be the private property of an individual to be monopolized for personal profit or subject to the passing whims of any puny mortal. But if we adopt this reasoning we may as well go a step further and hold that all natural beauty is the inheritance of all the people, that it has a distinct value to them just as clear air and pure water have, and that the men who needlessly scar the face of nature or turn it into a desert when they bore their oil wells, dig out ore, quarry rocks, or build factories and railroads, are as truly public enemies as those who pollute springs of running water or load the air with noxious vapors. It is certain, at all events, that men who appreciate their duties as citizens will not needlessly mar the beauty of the earth in which we live, they will not wantonly destroy the forests which give a glory to our landscapes, and they will treat with reverence natural scenery whose grandeur has an elevating influence and whose beauty brings refreshment to the spirit.

We are safe, too, in asserting that beautiful natural scenery has a positive value as a refreshment to the mind, especially of those who are worn and wearied by the stress of city life. This is not a mere metaphor. It is asserted over and over again, not only by poets and philosophers who give expression to the profoundest truths in our nature, but the curative value of natural scenery is distinctly recognized by the medical profession. All of us have felt the soothing and restful influence of natural beauty, acting in a subtle way through the very highest functions of our being, and tending to establish sound minds in sound bodies. When a city possesses a piece of scenery like Mount Royal, for example, it owns something more than so many acres of land whose beauty has power to attract the residents of the city to visit it for the sake of fresh air or exercise, or for a change of mental occupation. Such scenery, as is delightfully shown in a pamphlet published by Mr. Frederick Law Olmsted nearly a score of years ago, acts "in a directly remedial way to enable men to better resist the harmful influences of ordinary town life and recover what they lose from them. It is thus, in medical phrase, a prophylactic and therapeutic agent of vital value. There is not one in the apothecaries' shops as important to the health and strength and to the earning and taxpaying capacities of a large city." Whenever, therefore, a city possesses park-lands with exceptionally beautiful features, their preservation, even from a pecuniary standpoint, means the saving of capital; it is the husbanding of a source of health which is the source of all wage-earning power and the foundation of all wealth. The preservation and enhancement of natural beauty in public parks ought, therefore, to be insisted on, not from sentimental considerations alone, but for reasons based on the most substantial and practical truth.

When we consider the almost universal admiration and even affection among civilized men and women for broad natural landscapes, for "scenery as distinct from scenes," and consider its special restoring effect upon those who suffer from the nervous strain of city life, we have the one justifying reason for large urban parks. Small parks and playgrounds, formal squares, plazas and promenades are all valuable for other purposes, but for the highest rest and refreshment nothing will fill the place of stretches of beautiful natural scenery. Artificiality, the needless intrusion of buildings, anything which interferes with seclusion and the actual contact and communion with pure nature, defeats to some extent the highest purpose of such parks. The idea should never be harbored that rural parks can be improved by buildings however noble, by any work of art which is not entirely in harmony with the spirit of the scene, or by so-called decorative gardening, however choice and rare the plants employed. It is with regret, therefore, that we hear of a threat to erect a large museum in one of the Buffalo parks. No matter how stately the building will be, no matter how attractive or instructive the material it contains, it must forever be a defacement to the

scenery, which is the essence of the value of the park. No city in the world possesses more beautiful scenery or a park area more thoroughly characteristic of what is most delightful in the landscape of the part of the world in which it is situated than does New York in Bronx Park. There seems to be some danger that a portion of it which has been handed over to the directors of the Botanical Garden may be marred by the intrusion of buildings which could be placed elsewhere. Let us hope that conservative counsel will prevent any such desecration. The city spent money like water to create some charming natural scenery in what is now Central Park by blasting out ridges of rock, filling in the spaces with soil, and turning this desert of stone into tree-flecked meadow-land. Now that it has come into possession of scenery far more beautiful and ready-made, it would be worse than folly to destroy it.

Private Forestry and State Forestry.—III.

TOWNSHIPS* and counties, generally speaking, are scarcely qualified to own such reservations. Nearly all of these are so poor or so unstable as to render forest management impossible, except such as is merely meant for revenue. The population of the counties is too shifting to be interested in far-reaching local undertakings. Besides, if all the surrounding counties do not unite in the scheme, steps toward solving the forest question by a single community are useless. Forests are most needed in counties situated in mountainous regions, at the headwaters of the streams. But these are the very counties that, suffering comparatively little from the consequences of forest destruction, do not care to spend any money in the matter. The lowland counties are the interested ones, but they cannot legislate for the territory of other counties. The state alone, as the aggregate of all the counties, is capable of establishing and managing reservations. A public loan to buy such areas as must necessarily be kept under forest-cover—whether wood-clad now or not—might be obtained at a low rate of interest, as the security, consisting of real estate, renders it a safe investment. The United States, if necessary, might guarantee such loans, thus still further reducing the interest to be paid.†

There is most need of purchase by the state of such tracts as cover the steepest and highest ridges. These tracts command the lowest price, being but thinly stocked and more exposed to fire than to the lumberman's axe. Large areas, usually of bare land, are annually sold for taxes.‡ The state should secure those that are suited for a reservation and reopen them to the production of timber, which, in most cases, is the only possible product. Reforestation cannot, of course, be accomplished at once. It can be done gradually, the most urgent cases first. When protected from fire, some part of such reservation will be restocked in the course of time by nature. If any human action, apart from fire protection, is needed on such part, it will only be the closing of ravines and gullies. Any delay will greatly increase the cost, the land becoming more impoverished, natural regeneration more doubtful and the gullies growing worse. The less feasible it is to enforce maintenance of a forest-cover on lands owned by private persons the more urgent is the duty of the state to secure such tracts for itself.

A singular solution of the forest question is at the present moment recommended by the Minnesota State Forestry Association to the legislature of that state. The plan, drafted by Captain Judson W. Cross, provides "that persons may deed to the state for forestry purposes such land as is

unfit for agriculture, reserving the right of hunting for themselves, and the right to dig, mine and carry away such minerals, oils and coals as may be found on such land." No taxes are to be paid on it. The expected revenue from forest crops is to be divided as follows: Two-thirds shall be paid to an educational institution, and the remaining third to state, county and township, to reimburse them for loss of taxes. The Minnesota forestry plan, if it becomes a law, will provide an inexpensive method by which the state may secure large bodies of lands, which is the first and most important step toward state forestry. The next step is protection from fire, after which forest management might follow.

I might here describe the means by which the German Government has induced wealthy individuals to buy utterly worthless land and plant it with trees after having restored it to productiveness by steam-plowing and drainage. Such plantations are free from taxes for forty or fifty years.* The Government forest guards protect them from fire in connection with the work of protecting Government lands; the plants are furnished from excellent Government nurseries at cost price. The usefulness of this latter arrangement I cannot state strongly enough, and similar methods should be at least tried in this country.† The idea is not at all contrary to American principles; why can we not distribute plants from Government nurseries as fish are distributed from Government hatcheries? The prices which commercial nurseries quote are simply exorbitant, and the dealers are not prepared to furnish the kinds required in sufficient quantities at any price. Plants produced in forest nurseries en masse can be raised at one-tenth the expense.

Private enterprises, although fostered by the state, will, however, never solve the forest question. State forest reservations are a necessity wherever forests act as "barriers against losses." The reservations must be protected from marauders and fires by a staff of forest guards, with the necessary number of officers. The forest guards, wherever feasible, should also be employed in enforcing fish and game and forest-fire laws on private lands which may surround the reservations. An administration of this kind is as economical as it is effective. Strict discipline and freedom from political influence are necessary, and therefore a connection with the army seems advisable.‡

Biltmore, N. C.

C. A. Schenck.

Dock Gardens.

PIER parks or promenades were suggested by Mr. W. D. H. Washington in a report to the Tenement-house Commission of 1894. The idea so evidently contains the germ of practical relief for a crowded population in hot weather that under the charter for Greater New York the Dock Board is expressly authorized to plan certain piers in such a way that they will serve for purposes of recreation.

Mr. Olmsted once said, in support of a proposal to make a waterside park, that in such parks "for one acre of land you procured a thousand acres of space and fresh air." Mr. Washington states that a dozen of such pier parks as this could probably be created for little more than the cost of a park covering a single block in the city. His description will do equally well for the present plan, on page 253, which claims no other merit than an attempt to design an attractive formal garden and playground on architectural lines for the space at command. The structure, 544 feet

* In the United States exemption from or reduction of taxes on areas planted up is granted in Massachusetts, Wisconsin, Dakota, Montana and Utah. Iowa has repealed a similar law in spite of its apparent success. Indiana is going to grant a small reduction.

† The United States Division of Forestry was created for "the collection and distribution of valuable economic tree seeds and plants," among other objects. For lack of funds, however, practically nothing has been done as yet. (Report of United States Division of Forestry, 1890, p. 197, and 1891, p. 193.) The direct aid which the United States Government has held out in the interest of forest culture has consisted in permitting the acquisition of Government lands in the treeless region free of expense, by planting one-sixteenth of the area to trees. This method has proved of little avail. (Report of United States Division of Forestry, 1890, p. 197.)

‡ Professor Charles S. Sargent's excellent plan (*Century Magazine*, February, 1895, page 626). The majority of the forest guards in Germany are taken from the army.

* In Maine 1,000 acres of land are set aside in each township for public purposes, probably a good deal being timbered. But no enactment in reference to these lands exists. (Report of United States Division of Forestry, 1887, page 98.)

† Such a loan could and should be made the favorite investment of the thrifty workman, enabling him to invest money as safely as in a Government savings bank. The poor laborer all over the world is likely to lose his savings through investing them in speculations, the financial standing of which he has neither the education, the experience nor the means to investigate.

‡ In Pennsylvania the land advertised to be sold for taxes in June, 1894, amounted to more than one and a half million acres. (Governor D. H. Hastings' Message.)

long, 75 feet wide and 25 feet high, is to be built of steel and iron on the existing dock and foundation. The dock is flat, constructed on fire-proof arches and finished on top with a layer of Portland cement concrete, over which is a coat of asphalt, graded to carry off the water into gutters and thence into the river. Such a structure would be practically fire-proof. This dock would be reached by staircases at the land end under a portico.

The grass-plots and flower-beds would be surrounded by a curb to receive the soil in which the plants would grow. This gardening would need care to secure a maximum of effect with a minimum of expense, but need not be costly, though it would require annual renewal. Arbored walks could easily be covered with quick-growing flowering creepers and the beds filled with the common and ever-popular flowering plants. The portico and shelters roofed with iron could be provided with awnings like those on the open street-cars for shade and to turn a shower of rain. These shelters surround a playground for children, with a sand-heap in each corner. At the far end is a band-stand surrounded by arbor-shaded seats. Two drinking-fountains and plenty of benches complete the outfit, which should be surrounded by a high light fence for the prevention of accidents.

New York. *W. Hamilton Bell.*

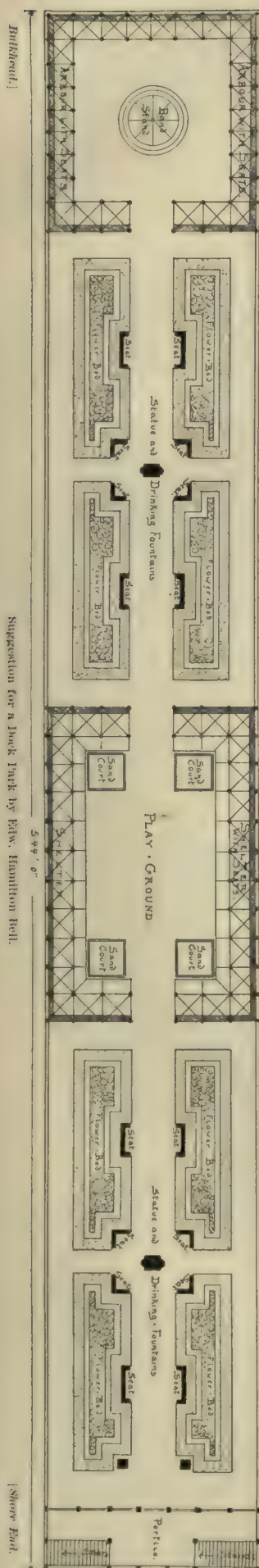
Roots in Commerce.—I.

ONE scarcely realizes how largely products of vegetation enter into use in the arts and the household in construction, for utensils, food, and a thousand other purposes. If, for example, we take up a wholesale drug circular, in the part set aside for "drugs and dyes" one will find several columns which include price lists of woods, barks, flowers, leaves and roots. To give some idea of the variety of these materials, the distant parts of the world from which many of them come, and the purposes for which they are made to minister to the wants of man, it is only necessary to glance at a single section, as, for instance, the roots. A trade list of roots names such familiar native plants as Blackberry, *Rubus villosus*, and *R. Canadensis* (the Dewberry),

the roots of which have tonic and strongly astringent qualities. Bloodroot, the root of *Sanguinaria Canadensis*, is also a regular article in trade. This plant, prized for its beautiful snowy flowers in early spring, is called also Puccoon, Tetterwort, Tumeric and Indian Paint, the latter name, doubtless, gained from the red juice of the bright-colored root. In trade its value is in its acrid, emetic properties and its use as a stimulant expectorant. The common Burdock, with its adhesive burs, a plant used largely as a food in Japan, as was described in an interesting article on page 143 in this volume, is one of the most popular of all the medicinal roots, both as a home remedy of country folks in spring-time, and in pharmacy, and is an ingredient in many of the patent medicines sold as blood purifiers. So greatly has the demand increased in recent years that, besides the large quantities grown in America, probably one hundred tons a year are imported from Europe. It is specially cultivated abroad, and imported roots are of better quality than our home product and cheaper, seven cents a pound being an average wholesale price. Calamus, the spicy delicacy of country school children, is another standard article of commerce, and comes whole and sliced, some of it known as white calamus, being bleached. The root of Calamus, or Sweet Flag, *Acorus Calamus*, has a pungent, aromatic taste and is credited with stomachic properties. It is also used as an adjuvant to tonic or purgative medicines. About four-fifths of the quantity consumed in this country comes from Germany. The entire root sells for six and a half cents a pound in wholesale lots, while that which is bleached and sliced brings three to five times as much.

Of Dandelion-root about one hundred tons are used in this country each year, half of it home-grown and the remainder from the fields of Germany. Its commercial value consists in its use in hepatic derangements and digestive troubles generally. Roasted and powdered, it is sometimes bought for coffee by the unsuspecting housekeeper. A native of the southern United States, esteemed for use as an anti-periodic in malarial fevers, is the root of *Gelsemium*, the yellow or false Jasmine, *G. sempervirens*. Perhaps a dozen sorts of Snakeroot are regularly listed, this name being given to many plants whose form or color is suggestive of a serpent. That known as Virginia Snakeroot is *Aristolochia Serpentaria*; the Black Snakeroot of trade may be *Sanicula Marilandica*, or *Cimicifuga racemosa*, while Seneca snakeroot may be some *Liatris* or *Eryngium*; white snakeroot is *Eupatorium ageratoides*. The general name is also applied to other roots, all of which have some reputation as remedies for the bites of serpents, and they are used as stimulants.

One of the most widely distributed American plants, which is nevertheless the most costly of all the medicinal roots, notwithstanding that the medical profession here hardly recognize it and regard it as inert, is Ginseng, *Aralia quinquefolia*. The entire product is eagerly collected and sent to China, where the demand is constantly increasing. This root has somehow caught the fancy and faith of the Celestials and is highly prized as a cure-all, and especially for supposed rejuvenating qualities. When the supply for China depended entirely upon that grown at home the roots had fabulous value, with their supposed power to prolong life. Phenomenal prices are paid for roots, which, in Chinese imagination, resemble dragons or other mythical objects, and a specially grotesque specimen with an imaginary uplifted head, many legs and an angry-looking tail, in the hands of a New York exporter of the root is stated to be worth its weight in gold. Collectors find it as near-by as Westchester County, and, indeed, the largest and highest-priced roots come from New York, West Virginia and Pennsylvania. The southern gatherings are of smaller roots, but even these, mainly from Tennessee and Kentucky, command \$2.70 a pound in wholesale lots here in New York, and larger ones of eccentric form from the northern states sell for \$6.00 a pound. Another native root-stock used in pharmaceutical preparations is that of the herb



Golden Seal, *Hydrastis Canadensis*. Not only has the home demand greatly increased in recent years, but large quantities are exported, as the efforts to cultivate it abroad have not been successful. It grows in the rich moist soil of the woods of our north and north-western states, and the extract has a phenomenally wide range of uses. A century ago it was generally used by the Indians for making a yellow dye. Mandrake-root, the laxative remedy of many households, known under its botanical name of *Podophyllum*, the May-apple of our woodlands, is another article of export. Of course, this must not be confounded with the Mandrake of the Mediterranean region, which belongs to the Nightshade family, and whose fleshy, forked, narcotic roots are often supposed to resemble a man in form.

Pokeroot, as it is called in commerce, *Phytolacca decandra*, is credited with a variety of helpful and wholesome qualities; the berries are said to be useful to reduce obesity, while the roots are hopefully used for rheumatism and as a poultice to induce suppuration. The green roots are five or six inches in length, an inch in diameter, and divided into several branches; when dried they are a light yellowish brown in color and much wrinkled. They are odorless, with a somewhat sweet taste followed by a sense of acidity, and are said to be emetic, purgative and somewhat narcotic.

Among imported roots are Aconite, native to the mountain forests of France, Switzerland and Germany, and cultivated in the latter country and in Great Britain. It has been introduced into America as an ornamental flowering plant, and the roots cultivated in the United States are found to be richer in the active alkaline principle than those imported. The ancients understood its poisonous principles, but it was not until less than one hundred and fifty years ago that it was used in medicine, and considered beneficial for the circulation and the nervous system. Another poisonous European root is Belladonna, the Deadly Nightshade, which grows wild and is cultivated in Great Britain and Germany. The corms of *Colchicum*, Meadow Saffron, from France and southern Europe, are used as a principal ingredient in all the famous old English gout remedies. Of Gentian-root, which comes from France whole and powdered, about three thousand tons are used here annually as the basis of tonic medicines. It has the recommendation of cheapness, costing from six to seven cents a pound wholesale. Most largely used of all, and imported in hundred-ton lots from Asia Minor, Southern Russia, Greece and other south European countries, is Licorice, the slender sweet root of the leguminous plants *Glycyrrhiza glabra* and *G. echinata*. Besides the dried roots, much of the extract is imported in rolls packed in Laurel-leaves, that from Italy being of the highest quality, and similar rolls are manufactured in this country. In pharmacy it is used as a demulcent in cough mixtures, to modify the taste of unpleasant medicines and to give consistence to pills and troches. Large quantities are sold for flavoring confectionery, tobacco and beer, and since the time of Elizabeth it has been cultivated in England to supply the demand of porter brewers. The Orris-root of trade is the rhizome of certain species of *Iris*. That known as Florentine, from Italy, is the highest grade, north Africa furnishing a somewhat lower quality, while a cheaper kind comes from the East Indies. It was once esteemed as a stimulant, but now is used only in perfumery and to scent powders and oils. Its fragrance, which suggests violets, is acquired in drying. Squill, from which the popular croup syrup is manufactured, and known also as Sea Onion, is the large bulbous root of *Urginea (Scilla) maritima*, which sometimes weighs fifteen pounds. The root contains 22 per cent. of sugar, and is used in the manufacture of whisky in Sicily. The supply is drawn from the countries and islands of the Mediterranean. Ipecac, the root of *Cephaelis Ipecacuanha*, reaches us from Brazil, by way of London, since the output is controlled by English capitalists, who keep the price to our importing

merchants at an average of \$1.50 a pound. Kava Kava, the large spongy root of *Piper methysticum*, comes from the Sandwich Islands. Used immoderately it has a peculiar intoxicating effect with great loss of muscular power, but is valued in medicine as a stimulant. The rhizomes and roots of Lily-of-the-valley were once popular in Russia as a remedy for dropsy. The root-stock of this plant is imported in pieces two or three inches long, covered with fine rootlets, and has a bitter taste. It has purgative qualities and is said to be sternutatory. Elecampane, introduced from Europe and familiar in our gardens and naturalized in the meadows and along the roadsides of the New England and middle states, is cultivated in Europe for its roots, which yield a tonic and stimulating extract, here used chiefly in chronic lung troubles and for some skin diseases. Its pungent taste is also familiar in tonics, and it is a favorite veterinary medicine.

Coltsfoot, the root of the perennial herb *Tussilago Farfara*, and of Comfrey, *Symphytum officinale*, are both in demand for cough mixtures, though the latter is gradually going into disuse. Colombo, the root of the Mozambique plant *Jateorhiza Columba*, is used as a tonic and antiseptic. Other staples are Bitter-root, *Lewisia rediviva*, the fleshy farinaceous roots of which are used by the Indians of the north-west for food; *Berberis Aquifolium*, or Oregon Grape-root, which comes in foot-long pieces and yields a bright lemon-colored bitter powder used for chronic skin diseases; Alkanet, *Alchusa tinctoria*, from the Grecian archipelago and southern Europe, valued for the deep red dye, and said to be used in the manufacture of spurious port wine; Arrowroot, from the West Indies and the Bermudas; Marshmallow, *Althea officinalis*; Lovage, *Levisticum officinale*, for flavoring in cookery and in barrooms; Black Cohosh, the root of the American herb *Caulophyllum thalictroides*; the porous Gentian-root, a remedy of the ancient Greeks and Arabians; the pungent, aromatic rhizomes of Galangal, from the East Indies and China, and used in bitters; Sarsaparilla, the roots of several tropical species of *Smilax*, and which has undergone great changes in reputation; Ginger, *Zingiber officinale*, from the East and the West Indies, and a staple in cookery and medicine; and Curcuma, or Turmeric, the root of *Curcuma longa*. This East Indian plant is used in medicines, condiments, chemical tests and as a dye, producing a yellow color, which by itself is fugitive, but it is largely used in conjunction with other dyes to produce special tints. It is also a harmless adulterant in drugs and spices.

No wide fluctuations in prices or supplies have occurred in recent years, since any scarcity in one locality, or attempt to make an artificial demand, is met by abundant supplies from other sections. The packages are generally bales of from fifty to one hundred and fifty pounds.

New York.

M. B. C.

Plant Notes.

New Plants in Santa Barbara.

AMONG woody plants of recent introduction that have been blooming here, probably for the first time in the United States, not a few deserve special notice, as they are sure to become permanent denizens of our southern gardens, and some of them are suitable, also, for pot culture under glass in the north. Their wide range of usefulness will hardly surprise persons who are even slightly acquainted with the climate of southern California, when the botanical genera to which they belong and the countries from which they come are considered. Leguminous plants take the lead in number, of course. Without mentioning many Acacias from Australia—some of them quite remarkable—which, perhaps, have already bloomed elsewhere, we have from the same continent *Goodia pubescens*, a low, dense, flat-topped shrub, with light green trifoliate leaves, which for months has been literally covered with good-sized pea-shaped yellow flowers. *Oxylobium callistachys* is another yellow-flowered shrub, with larger flowers in

terminal spikes. It is of upright habit, with foliage nearly as silvery as that of the famous Silver Tree. The Mediterranean basin has contributed several species of *Cytisus* and *Genista*, among them *Genista monosperma*, a prostrate shrub growing in sandy beaches on the southern coast of Sicily, glaucous and wiry, with hardly any leaves and fragrant comparatively large flowers, which are white, with a crimson blotch; *G. Æthnensis*, from Sicily also, found at several thousand feet elevation on Mount Ætna, very like a giant among *Genistas*, attaining the size of a tree, with very fine leafless twigs, in habit like a Weeping Willow, and profusely covered with sweet-scented sulphur-yellow flowers during summer. This *Genista* ought to be hardy at least as far north as Philadelphia, and old specimens exist in the grounds of the Botanic Garden in Paris, as well as at Kew. *Cytisus Palmensis*, from the Canary Islands, has been greatly admired throughout the entire winter for its myriads of pure white, strongly

be one of the most gorgeous flowering trees, with its very long clusters of large scarlet flowers.

To Australia we are indebted for *Hymenoporum flavum*, a near relative of the *Pittosporums*, but with flowers much larger than any of them, white, turning to yellow, and very fragrant; *Carumbium populifolium*, with greenish inconspicuous flowers and rich bold foliage, tinted with metallic hues, like other *Euphorbiads*; *Prostanthera nivea* and *Westringia rosmariniformis*, both belonging to the *Labiata* or Sage family, and white-flowered. We close the list with *Helichrysum diosmæfolium*, a remarkable tree belonging to the *Compositæ*. At present and for weeks it has appeared like a solid mass of silver, the flat umbels of its small everlasting flowers being several inches in diameter. It is said to grow twenty feet high in Australia, and certainly will grow as large in the fertile soil of California, and a very useful plant it is likely to prove to landscape-gardeners as well as to florists.



Fig. 33.—*Iris Robinsoniana* in a California Garden.

apple-scented flowers. This plant is sure to become highly popular in this country for growing in conservatories and for cut flowers as it appears to be in southern Europe. From Chili we have had in flower and fruit *Lithraea molleoides*, somewhat related to the Sumachs, a bushy rapid-growing evergreen tree. Its flowers are greenish and inconspicuous, and the fermented berries furnish a highly prized "chicha" or brandy in its native country. From Natal, south Africa, *Dombeya Natalensis* has been blooming during nearly the whole winter season. Its large white flowers are very attractive on account of their fragrance, which reminds one of the *Syringa*. At first glance they suggest a pure white large-flowered Cherry. This is a very rapid grower and essentially a winter bloomer, and we hope it is the forerunner in our gardens of many of its congeners. These all have showy flowers and are native of south Africa, and of Madagascar, from which we have already growing vigorously the noble *Astrapæa Wallichii*, said to

All the above-mentioned are shrubs or small trees; large-sized trees will take longer to reach the flowering stage. A very remarkable exception we find here in several species of the tropical genus *Ficus*, which often begin to bear "figs"—that is, flowers—when quite young, sometimes before they are two years old from seed. Such is the case with *Ficus Bengalensis*, *F. glomerata*, *F. Indica*, *F. infectoria*, *F. oppositifolia*, *F. religiosa* and *F. retusa*, all from India, and *F. Chauvieri* and *F. Parceli*, from New Caledonia and the South Sea Islands, all of which appear to be quite at home at Santa Barbara.

Santa Barbara, Calif.

F. Franceschi.

IRIS ROBINSONIANA.—This plant was discovered in Lord Howe's Island by Charles Moore in 1869, and described by Bentham under the name of *Morea Robinsoniana*, but it was not until the spring of 1891 that it flowered for the first time in England, at Kew. This *Iris* is not only noted for

its exceptional size, but it is remarkable from the fact that there is no other species of the genus in the Australian continent nor anywhere nearer than China. The Kew plant was figured in this journal (vol. iv., p. 355), and we now give a picture of another plant (see p. 255), which is interesting because it is probably the first individual of the species which has bloomed in America. It is in the garden of Mr. G. P. Rixford, Secretary of the Academy of Natural Sciences in California, and is said to be sixteen years old from seed.

Iris Robinsoniana is a stately plant with leaves from six to eight feet long and from three to four inches wide, curving gracefully near the ends and of a healthy glaucous color. It is worth growing alone for the beauty of its foliage, which is more attractive even than that of the New Zealand Flax. The flower-scapes are six feet high to the first branches, and the individual flowers open in the morning and close permanently before night. These are four inches across when expanded and pure white, except at the base of the larger segments, where there are lines of golden yellow. Although individual flowers are so short-lived, they appear in succession for a long time, so that a single plant will bear two or three hundred flowers and continue to display them for a month.

For the photograph from which our illustration has been made we are indebted to Miss Alice Eastwood, the Botanical Curator of the California Academy of Sciences.

Cultural Department.

Seasonable Notes.

THE height of the flowering season is now here with plants in the hardy flower border, and the unusually wet weather has induced an abnormal growth, with the result that many plants are unduly crowded. I never remember to have seen so luxuriant development of Larkspurs, Poppies, Pæonies, Thalictrums, and, indeed, all such as love moisture, and this includes about all the plants in the borders. We have found it necessary this year to go about and pull out a great number of the Columbines at the close of the flowering time, or as late as it was possible to tell their colors. The tendency in all cultivated plants is toward reversion if left to themselves, and this is soon seen in a mixed border where self-sown seedlings are allowed to grow. Those thus produced are generally inferior to the parents that are the result of much careful cultivation and selection. Especially is this true of Phloxes, Larkspurs and Columbines. The remedy for this is the rigid weeding out of all that do not come up to the desired standard of excellence. If this is not done our gardens soon present the appearance of those that have been left to their own devices for years and are dominated by the old purple Phlox and a few other plants that are equally hard to kill or eradi ate.

The Rhododendrons have been specially good this year, better than ever before, and the growth is now in full progress. It is a great deal of labor to go over the plants and pick off the old flower-stems, but, like many other tiresome operations, it pays well and prevents the plants from wasting their energies in seed-production. After such a heavy strain on their resources in flower-production the growths will not be so strong as in other years, and it is, therefore, especially necessary this season to take off the seed-vessels as soon as possible.

Of Tulips grown in the border, and even those that are massed for spring effects, we do not consider it at all necessary to take up the bulbs after flowering; let them remain in the ground and plant some quick-growing annual over them. It will be found that next year the results will be even better than before, and this is especially true of hardy species, though most bulb treatises recommend annual lifting. We find that the dry period we get in fall ripens up with good results—better than if lifting is practiced. If Narcissus have been planted for a number of years, and do not flower successfully, it is because of starvation from crowding, and as soon as the foliage has dried up the bulbs should be lifted carefully, placed separately in boxes, labeled correctly, set in the shade to become moderately dry, and then stored away to be cleaned on some wet days and made ready for replanting in September. It will be found that all the varieties of *N. poeticus* will have live roots attached to the bulbs. This species seems never to be actually at rest, but there is less root-action at the

time the others are dying down than at any other, so that it is safe to lift them with the others, even if there are live roots to be seen. It may seem trivial to tell about careful labeling of bulbs when lifting them, but we have found that with a moderately large collection, or even a small one, it is about impossible, in the first place, to lift every bulb in the ground, and, in consequence, it is better to plant in a different position next time, or mixing will be sure to follow. It also seems about impossible to label all so that they may be rightly distinguished at replanting time. This seems a matter to be easily accomplished, but let him who is sure of it try, and see how his bulbs look at flowering time next year, and the advice will probably not seem so unnecessary.

Any seedling plants that have been raised to add to the borders should be planted without further delay, and it is good practice to have such each year, either for the reserve border or for setting directly where they are to remain. It is also a good time to sow seeds of such as ripen early in the garden, for, if sown now, the plants will be large enough to set out in fall and save a lot of storage-room in the frames during winter and spring. There is no necessity for treating hardy plants under glass at all at this season, or, indeed, at any other, if sowings are made in early summer in carefully prepared seed-beds and transplanting is carried on during showery weather, remembering always the fact that the smaller a plant is, within reasonable limits, when set in its permanent position, the more certain it is to be long an occupant of the garden. Large plants rarely recover from the shift unless they have tuberous roots or some other reservoir to draw upon.

South Lancaster, Mass.

E. O. Orpet.

Plants in Flower at Wellesley, Massachusetts.

THERE is a fine specimen of *Hydrangea petiolaris* now in bloom on the estate belonging to Mrs. Durant, of Wellesley, clinging, Ivy-like, to the trunk of a large Elm-tree. It grows rapidly. From a small plant seven years ago it now reaches fifteen feet and covers all but the north side of the trunk. The flowers are produced in short-stemmed cymose corymbs, with a multitude of white-stamened fertile flowers encircled with white, large-petaled sterile florets, resembling closely the flower-heads of the other so-called single Hydrangeas. It is increased easily from cuttings and layers.

Raphiolepis Indica, a charming little bush, is now blooming profusely in the flower garden at Wellesley. It is known as the East Indian Hawthorn, and belongs to the same family. The form and shape of its short corymbs of bloom would suggest the Mountain Laurel, and it is almost as showy. It is a native of eastern Asia, not hardy here, and must be wintered in the same way as tender Rhododendrons and evergreens. It is propagated from cuttings of half-ripened shoots.

Styrax Obassia is now flowering finely in the grounds belonging to Mr. H. S. Hunnewell. It is one of the most attractive of the many hardy shrubs introduced within late years from Japan, where it is a native of Hondo and Yezzo. The specimen here assumes the aspect of a small tree, in its foliage resembling the Linden. Its attractive snowflake-like blossoms suggest the Halesias, and we find that the *Styrax* typifies the family to which both belong. The blooms hang on short stems from the under side of the branches, and are almost completely hidden by dense foliage, but one would almost recognize the plant by its strong Hyacinth-like perfume. It is said to be difficult to establish, and probably on account of this its hardiness has been in doubt. With a suitable location in partial shade and the protection of taller trees, it is here a thrifty and robust-looking plant. It can be multiplied freely from cuttings.

Benthamia Japonica (*Cornus Kousa*) is here a small upright-growing tree. One would recognize it at a glance as an ally of our *Cornus florida*, though, coming into bloom later when vegetation is in full leaf, it is not so conspicuous an object. The bracts differ from those of the American species in being ovate-acuminate instead of obovate and emarginate.

Wellesley, Mass.

T. D. Hatfield.

Rock Garden Notes.

UNDER the influence of our hot summers *Thymus serpyllum* is scarcely recognizable from its appearance in its native habitats. The stems grow from one to two feet long in a season. It flowers freely enough, both flowers and foliage being much lighter in color than in its native haunts. *Geranium sanguineum*, a European species which grows naturally on rocky cliffs, is one of the most reliable plants we have for the embellishment of the rock garden during the entire spring and summer. Seldom do we see it without dozens of its large

pink flowers nestling among the star-shaped leaves. It grows only about ten inches high, and a plant two years old will, under favorable circumstances, grow to about three feet across. Young plants are quickly raised from seeds. North of here *Silene maritima* ought to do well in the rock garden. It behaves well enough with us until about the middle of July, when it succumbs to the hot weather. Seeds are saved of it, however, and sown in the fall and left to themselves in a cool frame for the winter. This species has dense masses of light green foliage, only a few inches high, and the flower is pure white, with a very large inflated calyx.

Silene Armeria is desirable for this class of work if kept within proper bounds. In the garden here it would not be long in appropriating most of the space to itself if left alone. It is a very free seeder. The seed of this year's flowers self-sown will come up about the beginning of September and form bushy little tufts before cool weather. The seedling plants come into bloom early in the spring and are followed by others which germinate after the cold weather has gone.

Pentstemon Torreyi when not in flower grows about six inches high. The flower-stalks, however, get to be about three feet tall, and although they are flowered sparingly, their bright red color makes a very effective plant.

Saponaria ocymoides is almost past blooming; it forms a dense cushion of five-petaled pinkish flowers. The climate here seems to suit it exactly.

Polygonum repens, as its name implies, creeps close to the ground, rambling over the stones and filling up chinks in a pleasing way. In the hot months the foliage is of a reddish tinge, but the full crop of flowers is not produced until the fall, when even small plants display myriads of close, round heads of dull pink flowers. With us it is not hardy, but it is well worth saving a pinch of the seed every year and treating the plant as an annual.

Cerastium Biebersteinii is past blooming for the season, and the flower-stalks have been cut off; the silvery foliage remains, however, and is attractive all the season. This species does much better with us than the common *C. tomentosum*.

Spiræa Anthony Waterer is an excellent companion in the rock garden to the Japanese species, *S. bullata*. All last summer the former displayed its rose-colored flowers, but it is well worth growing for the foliage alone, which is partly variegated with white and sometimes takes on a bright rosy tint.

The *Onosmas* are rather fickle plants to deal with in this latitude, where the soil is baked, and dry soon after drenching rains. Sometimes a plant in full bloom will suddenly die down, root and branch, while others near it will continue in perfect health. They are among the most desirable rock-work plants we have on account of their graceful appearance when in bloom and their delicately scented flowers. *O. stellulatum* is not quite so floriferous as its variety, *Tauricum*. It should be planted in a light airy place where the sun will not strike directly on the root-soil. Pieces of rocks placed around it form a good protection. Cuttings will root under the north side of a wall if kept from wilting by the aid of a glass cover.

An odd-looking plant is *Baptisia perfoliata*, with all the leaves facing outward from the centre and placed perpendicularly on the stalks. It has rather pretty yellow flowers.

Botanic Garden, Washington, D. C.

G. W. Oliver.

Greenhouse Notes.

THE fancy-leaved *Caladiums* are always considered effective, and since the summer is their growing season they are now a convenient addition to the conservatory. In fact, such an attractive plant as *C. argyrites* is almost indispensable even in a small collection. These plants should now be growing rapidly, and need abundant watering and good soil. Comparatively large shifts in repotting are better than frequent disturbance of the roots. Well-rotted cow-manure is one of the best fertilizers, and from one-third to one-half the compost is not too large proportion for strong-growing varieties. Although much water and a moist atmosphere are required for *Caladiums*, an extremely high temperature and heavy shading should be avoided. Very large leaves may be developed by these means, but it is done at the expense of substance and durability, and such plants will scarcely bear removal to an ordinary conservatory, and still less the exposure of an exhibition hall.

Gloxinias and *Tuberous Begonias* are also now approaching their prime, and while they assimilate large quantities of water when in full growth they should not be watered much overhead, or the leaves of *Gloxinias* are likely to become diseased. When well established, clear manure-water of moderate strength is beneficial, given at intervals of about three days.

In the race for large and durable flowers of *Tuberous Begonias*, some interesting and beautiful varieties of a different type seem to have been neglected—for example, *B. Boliviensis*, *B. Chelsonii*, *B. intermedia*, *B. Sutherlandii* and *B. Weltoniensis*, all of them easy to grow, readily increased by cuttings and free in blooming.

Gesneraceous plants are at their best during the summer; some of them interest for the profusion of flowers in many brilliant colors and some for their rich foliage. The handsome foliage plant of this family is *Drymonia Turialoæ*, of moderate growth, and was probably more common in gardens twenty years ago than now. It is a native of South America, with large oval leaves of much substance and silvery gray in color; the flowers are also quite large and creamy white, and are produced with much freedom from the axils. It propagates readily from cuttings, and the leaves will root as do those of *Rex Begonias*, but are rather uncertain in forming plants.

Gloriosa superba is attractive for the conservatory in summer if several bulbs are planted in a large pot and the growths trained informally over a trellis. It is, however, impatient of any disturbance to its roots after growth has begun, and the best method is, therefore, to plant the bulbs in the pot in which they are to remain for the season. A rich, light loam is the best, and after potting water should be given sparingly until the plants have made considerable growth, for sour soil is fatal to success. The best specimens I have seen were grown in a warm house in full sunlight.

For a cool conservatory *Tropæolum tricolorum* is an admirable little vine for pot culture. When the tubers are first planted the directions for watering *Gloriosas* should be followed. A graceful method of training is by means of some twiggy branches from a dead Cedar-tree placed in the pot, on which the slender shoots are permitted to ramble at will. A well-grown plant under this plan is a picture of unstudied beauty.

A collection of native pitcher plants (*Sarracénias*) and hybrids can be made another interesting feature of the garden under glass. A high temperature is not necessary, and the conditions in a *Camellia-house* prove about right. Such kinds as *S. flava*, *S. Drummondii*, *S. rubra*, *S. variolaris* and *S. psittacina* are the best, and favorable conditions for their culture are found in as close an approach as possible to the conditions of a natural sphagnum swamp. The pitcher plant of the Pacific coast, *Darlingtonia Californica*, is also a most interesting species, but, unfortunately, is seldom an entire success under cultivation.

Holmesburg, Pa.

W. H. Taplin.

Correspondence.

The Sycamore Blight.

To the Editor of GARDEN AND FOREST:

Sir,—I observe that the Sycamore-trees in this section are all losing their leaves. The leaves seem to have been destroyed by some disease or some insect, so that they present a sorry appearance. I should be glad if you would tell me the cause of this defoliation, and, if possible, suggest some remedy.

White Plains, N. Y.

R. A. S.

[This blight of the Sycamore, *Platanus occidentalis*, now so prevalent, which gives the trees such a distressed look, is due to the unusual development of the fungus *Gleosporium nervisequum*. This disease has been at work upon the Sycamores for several years, and, gradually increasing in force, the time has come when either the fungus must be checked or the host will perish. Already many trees have died, and at the present time a large portion of the Sycamores in the eastern states are nearly leafless, and the young branches are dead or nearly so. The fungus develops early in the season, and, attacking the leaves before they are fully grown, causes them to turn brown, and, with their dead young shoots shriveled and clinging to the larger stems, the trees are noticeable for their forlorn appearance. Attacking as it does the leaves and the buds that might otherwise soon produce new foliage, the fungus is particularly destructive.]

It is not improbable that spraying would do something toward saving the trees, but the large ones are not easily covered with a fungicide, and, owing to the trouble and expense, one will not usually spray a tree unless it is a particularly precious one. In such a case the standard Bordeaux mixture could be used with a pump in the same

way as insecticides are applied to large Elm and other trees. The numerous dead branches upon a victim to this blight harbor the fungus, and they should be removed before spraying will have its best effect.

Considering the history of this disease, its insidious nature, the large size of the trees and their almost lifeless appearance, it looks as if heroic treatment with axe and fire was the only way to meet this enemy. I lately saw a long line of Sycamores standing as unsightly victims of disease along a village roadside and thought then that they should give place to trees not susceptible to such a relentless enemy as this anthracnose.]

New Brunswick, N. J.

Byron D. Halsled.

The Durability of Pitch Pine.

To the Editor of GARDEN AND FOREST:

Sir,—My grandfather settled in Sussex, the northernmost county of New Jersey, in the year 1801, where he bought a small forest clearing and lived in a log-house which was then standing. Some twenty years later he built another house, and since the flooring in the log-house was perfectly sound he used it in part of the new house. This flooring was made of what was locally called Yellow Pine—really it was Pitch Pine, *Pinus rigida*—and I well remember as a boy, nearly half a century ago, seeing the pitch fry out of the boards near the kitchen stove. The original log-house must have been built when nails were expensive, for the boards had in them auger-holes, through which they had been pinned to the sleepers by wooden pins. Half a dozen years ago the part of the house where the old flooring was laid was taken away, and these pine boards were perfectly solid, heavy with pitch and apparently good enough to endure another hundred years of use.

Deckertown, N. J.

W. A. S.

Exhibitions.

Horticulture at the Tennessee Centennial Exposition.

THE visitors who have attended national or state exhibitions in this country which aim to represent the highest achievements in horticulture have usually been disappointed. Of course, the perishable nature of horticultural products makes it difficult to show them well, while in all the large displays the classification has been unnatural and incomplete. Even at the Columbian Exposition, which exceeded in interest and variety previous attempts in this direction, vegetable gardening and the nursery industry were inadequately represented, while the floricultural exhibit was not a true index of the status of that industry in this country. At the Tennessee Exposition the horticultural exhibit is merged into the general agricultural display. This is seen in a structure three hundred feet long by two hundred feet wide, with a central dome a hundred feet high. Here are the state and county exhibits of the products of the farms, orchards and gardens of the south. The prominent feature of the pomological display is the amount of fruit preserved in some transparent liquid and held in glass jars. Of these state and county displays that from Georgia is the most elaborate, the bottled fruit being uniformly well preserved and artistically arranged in irregular pyramids. Many of the jars or bottles are of elaborate design and ornamentation. Various preparations are used for saving the fruit, the fluid often being pure water containing a small amount of sulphurous acid, salicylic acid, or corrosive sublimate. For preserving berries a one per cent. solution of boric acid is the most satisfactory, especially for red and black raspberries, blackberries, red and black cherries, black currants and other red or dark-colored fruits. The Florida exhibit contains a fine display of citrus fruits preserved in sulphuric acid used at the rate of about two ounces to a gallon of water. But, although this preserved fruit makes a fine display, it is from an educational point of view of comparatively small value. The glass jars exaggerate the size of the individual fruits so that they are deceptive, and the method admits of no sampling, so that some of the most important characteristics of the varieties are entirely lost. It is just to say, however, that these exhibits were the centres of attraction in the agricultural building, and that Georgia, Florida, Tennessee and other states which made strong competitive displays in this direction will be amply repaid for all their expense and trouble. Many visitors gained broader ideas of the horticultural possibilities of the south than they had possessed before.

The Tennessee June exhibit of fresh fruit, while meagre, was instructive. But even here there seemed to be an un-

written law that what was lacking in quantity or quality must be made up in fantastic designs.

The Sneed peach was one of the first large fruits to be exhibited. It is said to be a descendant of the Chinese Cling, and is thought by many to mark the introduction of a new type of very early peaches. Following the Sneed in point of earliness came Alexander, and unnamed peaches from various parts of the state were thereafter received almost daily.

Cherries of many varieties have been on exhibition during nearly the whole of June. The earliest varieties were the Dyehouse and Early Richmond, and later the sweet cherries. As showing something of the range of season covered by this fruit as well as the difference in latitude and the short time that elapses between blossoming and maturity, it may be stated that at the time the first cherries were exhibited from Tennessee some varieties were still in bloom in northern Ohio.

There were a few creditable exhibits of nuts, but no adequate representation of what promises to be a profitable industry. The most important and valuable displays were of Pecans, and these native nuts are now seriously attracting the attention of fruit growers.

It is to be hoped that during the progress of the exposition more attention will be paid to the fresh products of the orchard and garden. For example, our native and introduced plums ought to make one of the most varied and attractive exhibits of late summer and early autumn fruit. They can be readily shipped; they keep well on plates and in nearly every state there are varieties that can be grown with satisfaction and profit. There is a wide and growing interest in our native plums, and they seem destined to play an important part in the development of the horticultural possibilities of the interior and southern states. Over fifty varieties were exhibited at the World's Fair in Chicago, and the number has been greatly increased since then.

More attention should also be given to the products of the vegetable garden. The hope of the south lies in a more intensive and more diversified agriculture and horticulture. Small holdings devoted to fruit and garden vegetables must take the place of some of the large Cotton and Tobacco plantations, and then the real economic advantages of the south will not only be appreciated, but improved.

Columbus, O.

William R. Lazenby.

Boston Rose and Strawberry Show.

THE conditions for outdoor Roses have been so good this year that every one expected that the Rose show here would excel all its predecessors, but the season was late, and at the date when it was generally supposed Roses would be just at their best, or perhaps going into a decline, the best buds had not really opened. Still, the two hundred vases of General Jacqueminot sent up from Pomfret, Connecticut, by Miss E. J. Clark (John Ash, gardener) were as fresh and good as it is possible to grow them in the open air, and they made a mass of crimson which will not soon be forgotten by any who saw them. Two large tables were filled with Roses from Miss Clark's garden, the best of which were such standard varieties as Fisher Holmes, John Hopper, Mrs. John Laing, Baroness Rothschild, Duchess of Teck, Magna Charta, Paul Neyron, Marquise de Castellane, Ferdinand de Lesseps, Baron de Bonstettin, Madame Gabriel Luizet and the old Centifolia. M. H. Walsh has usually brought a magnificent display from the estate of Joseph S. Fay, and he had the usual number of fine flowers, although there was less variety than in former years, owing to the lateness of the season. The light pink Catherine Soupert was superb, and his new hybrid Tea, Lilian Nordica, which last year gained the silver medal, was again shown in first-rate form. It is pure white and seems very hardy. It is a cross between the hybrid Tea, Margaret Dickson, and the pure Tea, Madame Hoste, so that it is three-quarters Tea blood. W. A. Manda, of South Orange, New Jersey, exhibited some of his crosses between Rosa Wichuraiana and such Tea Roses as Perle des Jardins and Madame Hoste which have a fine Tea fragrance and evergreen habit.

The Orchids were unusually good. The prize-winning collection of six plants in bloom was that of Mr. E. V. R. Thayer (E. O. Orpet, gardener), which contained fine specimens of the peculiar *Anguloa Ruckeri*, *Cattleya Mendeli* in a white form with a tinted labellum, *Miltonia vexillaria*, *Cattleya gigas*, *Cypripedium Curtisii* and *C. superciliale*. Mr. J. E. Rothwell showed a superb *Oncidium papilio*, *Dendrobium Phalaenopsis*, a splendid variety of *Laelia grandis* with bronze sepals and petals and violet lip, and excellent specimens of *Odontoglossum crispum*, *Cattleya Mossiae* and *Cypripedium bellatulum*. W. P. Winsor (Peter Murray, gardener) had also a

noteworthy collection. Among them was conspicuous a specimen of *Epidendrum vittalium* with sixteen spikes of orange-scarlet flowers, besides *Miltonias*, *Cattleya Mendeli*, *Cypripedium grande* with five stems and fifteen open flowers, and other admirable plants. Mr. W. A. Manda was awarded a special prize for a new form of *Laelio-Cattleya Arnoldiana* with violet sepals and petals, purple lip and yellow throat.

The herbaceous *Pæonies* of Mr. T. C. Thurlow attracted much attention, especially the seedlings, some of which had decided merit. Mr. L. W. Goodell showed two tubs of fine *Nymphæas*, which made a conspicuous feature in the upper hall and proved how much we owe to the skill of Monsieur Marliac for some of the finest early effects in our outdoor gardens. Mention should be made also of Mr. N. T. Kidder's specimen of *Bougainvillea Sanderiana*, which was unusually bright and well flowered, of a few belated *Rhododendrons* shown by James Comley, of the superb *Sweet Williams* of Mr. W. N. Craig, Taunton, Massachusetts. Mr. Craig also had a general collection of border flowers such as *Carnations*, *Coreopsis*, *Campanula persicifolia*, *Foxgloves* and many more. Carl Blomberg also had an excellent collection of seventy herbaceous plants, and Mrs. E. B. Richards had a display of wild flowers which included the most attractive kinds now in bloom, and had a distinct educational value.

The strawberries were not as numerous as they have been in former years, but some of them were as big as peaches. Marshall still holds the lead hereabouts, and judging from the magnificent samples shown by Varnum Frost, G. V. Fletcher and C. H. Souther it will not soon be superseded. There was also a good display of vegetables. Among the principal prize winners besides those already mentioned were Kenneth Finlayson, the Bussey Institution, Rea Brothers, J. L. Gardner, Patrick Kane, W. H. Spooner, Miss E. M. Gill and W. C. Winter.

Boston, Mass.

R.

Recent Publications.

The Spruce Forests of Maine.—I.

Third Annual Report of the Forest Commissioner of the State of Maine, 1896. Augusta: Burleigh & Flint.

That the forestry question in the United States is rapidly emerging out of the hands of the popular propagandist into those of the practical business man is evidenced by several of the publications that have emanated within the past year from official sources. The report of the Forest Commissioner of Maine deserves perhaps the most credit in that it approaches the subject entirely from the business side of the forest owner or forest exploiter. The Commissioner, himself, who fills the position only as an additional duty to that of Land Commissioner, occupies only ten pages of the report, in which he briefly discusses the results of the administration of the forest fire laws. He dwells on the fact that the mere knowledge of the existence of an organized service, evidenced by the "fire notices" widely displayed, has been sufficient to prevent many fires; yet lack of power to act in cases of emergency is complained of, and a fire patrol to follow every railroad train in the dry seasons—which appears a somewhat extravagant demand—is suggested. After a few slurs on the collection of "scientific data" as against "wholesale practical information," he introduces the report of Mr. Austin Cary, who received his first insight into this line of work when employed in the Division of Forestry for the purpose of making measurements of the rate of growth of Spruce and White Pine and afterward made a short trip to Germany in order to gain some rudimentary knowledge of German forestry methods. This report contains so much that is valuable, new, suggestive and desirable to be brought forcibly to the attention of Maine lumbermen that it is a matter of regret that Mr. Cary has chosen a diffuse style and the introduction of much irrelevant and personal matter. In these busy days one objects to working over 200 pages of ore to get out fifty pages of pure metal.

The subject of the report comprises, briefly stated, an investigation into the condition and promise of the Spruce forests of a part of Maine, namely, the portion on the Kennebec and Androscoggin River basins. The report attempts a statement from hearsay of the amount of standing timber; gives a description of the conditions of different

spruce areas, especially after the lumberman has cut them over; and, what is most interesting, furnishes data regarding the growth of spruce with a view of determining what aftergrowth takes place and what method of cutting may be most profitable. Various other matters are discussed in separate chapters, such as the methods of scaling, showing the irrelevancy of the board-measure unit, statistics of lumber cut and boomed in various places, description of the methods of computing growth, calculations of growth of spruce on cut-over lands, waste of logging, etc., all matters of great interest and importance and often well stated.

To briefly summarize the more important results of this investigation, we learn from them that the spruce area of Maine, that which bears spruce in merchantable quantity, is found on the broad, mountainous plateau whose axis runs from the White Mountains across the Rangeley and Moosehead Lakes to Mars Hill at the St. John River, by which the state is divided into a northern and southern slope. The area thus containing spruce is set down as 22,000 square miles. The spruce rarely occurs in pure growths, except on the higher elevations; it is mostly mixed with hardwoods, which form two-thirds to three-fourths of the natural cover, and toward the outer boundaries of the spruce area, with decrease of elevation and improvement of soil, the hardwoods become more and more prominent, finally occupying the ground practically by themselves. The centre of best spruce development, in number of trees at least, is found near the Rangeley Lakes and Moose River and westward to the White Mountains in New Hampshire. Individual development, to be sure, improves with soil conditions, and the best sizes are found on the best hardwood lands; the maximum average dimensions being set at eighty feet in height and two feet in diameter, breast-high.

The estimates by local lumbermen of available spruce standing are given as 1,260 million feet on the Kennebec River with a total spruce-producing area of 1,964 square miles, of which 400 remain virgin, and 3,600 million feet, board measure, on the Androscoggin, in Maine, on a spruce-bearing area of 830 square miles, of which 420 are estimated virgin. Of this latter figure Mr. Cary says that it includes trees down to the smallest log size, and is based on very close economical utilization, while the usual practice in other localities of Maine would bring this figure down to 2,000 million feet. The average stand per acre on the basis of the larger figure would be 6,800 feet, and considering that half the area has been cut over, the average stand for this region, Mr. Cary says, should probably be set as high as 9,000 feet when in natural condition. From the various measurements of actual acre-yields, however, it would appear unsafe to apply this figure to any large area; for the best measured acre, in Grafton, Oxford County, gave with 526 Spruce-trees out of a total of 884 trees of all kinds and a total volume of 2,760 cubic feet of spruce, only 76 trees over eight inches in diameter, which scaled 8,792 feet, board measure, and another acre in the same county with 191 Spruce-trees, out of a total of 535 trees of all kinds and sizes and a volume of 2,220 cubic feet of spruce, gave 63 trees over eight-inch diameter, which scaled 7,352 feet, board measure. The majority of trees, it must be understood, are under a three-inch or at least under a six-inch diameter, while the eight-inch diameter seems to limit the available log size. Another acre in Somerset County, Kennebec drainage, on rocky land, moss-covered and of slow growth, 2,000 feet above-sea-level, which, as the author states, represents a large stand for spruce, "as much in fact as could well grow on the ground in this size of trees," "their crowns shading the ground about as densely and evenly as Spruce ever does," contained 346 trees of Pine, Spruce and Fir over three-inch diameter, of which 266 were Spruce with a volume of 2,800 cubic feet, while the thirty Pines, a forgotten remnant, all over eleven inches in diameter, represented 2,040 cubic feet in the yield, each equal to 6,000 feet, board measure, or 12,000 to the acre.

Since the present cut in the regions under consideration is estimated at 310 million feet a year, against a supply of virgin timber of 4,860 million feet, even without an increase in the cut, which is always to be expected, there would appear hardly sixteen years' millable timber in sight under present methods of cutting, and it appears that on the Androscoggin, which represents the larger portion, the cut is even now as close as it could be.

Washington, D. C.

B. E. Fernow.

Notes.

The latest of Mr. W. A. Manda's hybrid Roses to bloom is a seedling from Rosa Wichuraiana fertilized with the crimson Tea Rose Meteor. The flower is a light pink, very double, and the plant is a strong grower, prostrate in habit and with foliage which remained green all winter and stood out-of-doors without any protection.

Nuts for Profit is the title of a little paper-covered book of 150 pages which has been prepared by John R. Parry, of Parry, New Jersey. It contains much useful information collected from many sources on different kinds of edible nuts and their cultivation as adapted to various sections of the United States, besides some useful receipts for preparing nuts for the table in attractive ways.

We have received from Professor William Trelease, Chairman of the Nomenclature Committee of the Society of American Florists, a note, inviting our readers who may have observed cases of misnaming, renaming or any other irregularities in the names of plants which are bought and sold in America, to notify him of the fact by the first of August. It will facilitate the labors of this committee, which reports on the nomenclature of the decorative plants handled by American dealers, if such irregularities are promptly reported and full details are given.

Special consignments of small lots of sugar corn have been received from the south for a month past, but these have been sold directly to a few of the best hotels, and not opened up in the markets at all. On last Saturday the first corn from Delanco, New Jersey, sold in Washington Market at sixty cents for a dozen ears. Cylings, the flat scalloped squashes, new celery, peas and cabbage are coming from Long Island now, and on Saturday the excessive supply of southern string-beans was further increased by the first large lots of this vegetable from Long Island. The round sort known as Refugee brought double the price of the less tender flat kinds. Large fleshy Windsor beans are also now in season. Occasionally Peach tomatoes, from California, so named from their striking resemblance to that fruit in shape, color and bloom, are seen in the wholesale markets, where they seem mainly to be regarded as a curiosity. Lima beans are expected daily from the south, and when these and new sweet potatoes are in the market the entire list of fresh vegetables will be complete. Asparagus continues one of the staples, with cauliflower, cucumbers and eggplants. All vegetables are coming in from southern and neighboring states in immense quantities, and although they are of excellent quality the urgency of the demand in the wholesale markets does not keep pace with the increasing supply, so that while the consumer pays an average price, the grower finds his profits swallowed up in expenses for packing, transportation, commissions and the like.

The trays of the Italian and Greek fruit venders which line the curbs of sections of our downtown business streets are now stocked with a wide variety and indicate the range there is to choose from. Each tray offers but one sort, and for a week past peaches, from California, have been abundant and attractive and of unusually good texture and flavor. Apricots are also plentifully seen, with trays of Le Conte pears, bananas, plums and cherries. The bright and showy light Royal Anne cherries are almost as large as the smaller Botan plums now coming from Florida, and Black Tartarian cherries are almost as handsome in their rich dark color and large size. White and red currants from the Hudson River section of the state, and raspberries from New Jersey, are seen in large quantities. The supply of strawberries is beginning to lessen and is mainly from this state. Huckleberries and cherries are coming from as far north as New Jersey and New York, and blackberries from Maryland. Northern Spy and Russet apples from last year are still in market, and five barrels were exported so late in the season as last week, when considerable quantities of green apples are being received from North Carolina. In the fancy-fruit stores last year's P. Barry pears are also yet in stock. Niagara grapes, watermelons and muskmelons are

all to be had, the latter mostly small. Some muskmelons from New Orleans are of extra-large size, however, and those of spicy flavor readily command \$3.50 for a box of six fruits in wholesale lots, while some of the same size, lacking in quality, bring but \$2.00. Some really good fresh figs came into this market last week from California. They were large, plump, and with an attractive clear purple skin, and while, of course, their flavor had suffered somewhat from the long journey in a refrigerating car, they were pronounced delicious by the few persons who could afford to buy them at \$1.00 a dozen, and \$2.00 for the choicest.

Everybody in England has lately been engaged in summing up the progress of the kingdom during the sixty years of Queen Victoria's reign, and *The Gardeners' Chronicle* publishes an interesting résumé of the progress which has been made in horticulture during this period. In regard to Roses in particular we are reminded that when the young Queen was crowned the Hybrid Perpetuals had not yet risen to the dignity of a class, Tea Roses were almost unknown, the dwarf Polyantha Roses had not been introduced, and what are called Summer Roses were about the only adornment of gardens. The advance in Hybrid Perpetuals, Roses of exceedingly mixed origin, has been most extraordinary. The hybrid China Rose, Gloire des Rosomanes, may have been in existence at that time, but General Jacqueminot, which is a probable seedling from it, did not appear until as late as 1853. La Reine was one of the introductions of Laffay as early as 1839, but the great number of exhibition Roses which we know to-day were not produced until the sixties or seventies. Of Tea Roses, Safrano and Bon Silene date from 1839, while Devonensis, the earliest English-raised Tea, was sent out in 1841. All the great Tea Roses have appeared since Niphetos was sent out in 1844. In the Noisettes, which, as is well known, are of American origin, there has been great improvement, especially since the introduction of Tea blood into the original stock. Of course, the hybrid Teas are of comparatively recent origin, while the Polyantha Roses, with such developments as the Crimson Rambler, are all modern additions to our gardens. Rosa rugosa came from Japan many years ago, but R. Wichuraiana and other single-flowered species are later additions to our garden plants, while the efforts to hybridize the Sweetbrier, Rosa setigera, and the single-flowered Roses generally with other classes were begun but yesterday. It may be added as a good tendency of the times that the single Roses which were comparatively neglected in the early years of the Victorian era are now assuming the position they deserve as garden plants of the highest decorative value.

Three plants belonging to the Mustard family, which are weeds in the fields of western Europe, have been reported within the past four years in several localities in the northern United States and Canada. The first of these is Gray Berteroa, Berteroa incana, an annual with a rosette of leaves at the base, numerous white flowers and seed-pods a quarter of an inch long divided into two cells, each of which contains six seeds usually. These seeds are brown, of about the same size and weight as those of Red Clover, and therefore difficult to separate if the two become mixed. Since an average Berteroa-plant contains five thousand seeds, while a Red Clover plant produces in two years about one thousand, it is very easy to see that if only a small per cent. of the weed seeds germinate they will soon be much more abundant than the Clover. Of course, no Clover or Grass seed should be gathered from fields infested with the Berteroa. Wherever a few plants are found they should be pulled up by hand, and where they are abundant they should be mowed as often as the flowers appear. The Hare's-ear Mustard, Conringia orientalis, is another slender-branching annual, smooth and grayish. It is already in the grain-fields of Manitoba, and the seed of wheat and oats in that region ought to be carefully cleaned. Flaxseed from infested fields should not be saved for sowing at all. It is a conspicuous plant, easily recognized, and it should be pulled or mowed as soon as seen to prevent establishing it in new localities. Its white flowers are handsome enough for the flower garden, and its tender leaves, with a mild mustard flavor, make a good salad, but if ever used in the garden none of the seeds should be allowed to fall. Ball Mustard, Neslia paniculata, so called because its pods, about one-twelfth of an inch in diameter, are nearly spherical, is the third weed. It does not produce many seeds, and it has certainly spread slowly, because it has been known in America for fifty years. It has become abundant and troublesome in the grain-fields of southern Manitoba, however, and it seems to be developing an increasing ability to spread. These plants are described and figured in a circular prepared for the Department of Agriculture by Lyster H. Dewey, assistant in the Division of Botany.

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The True Function of City Parks.

THE President of the Board of Education of this city has made a proposal to the Board of Public Parks, of which this is the essence: "There are few among our public-school children who are able to recognize when they see them the various grains, the production of which constitutes so large a portion of the wealth of this country. I suggest, therefore, that you prepare a small piece of ground in Central Park, say, two hundred feet long and fifty wide, and divide it off into distinct lines so that there can be sowed in the first division of the space wheat, in the second oats, in the third barley, in the fourth rye, and in the fifth corn. The crops can be allowed to grow until ready for harvest, when they can be cut, laid in shocks and sheaves, and allowed to remain for such a time as would be desirable for the continuance of this object-lesson."

Persons who are familiar with the history of our city parks are not surprised at any attempt to divert them from their primary purpose. Long before the lower half of Central Park was completed the Park Board was urged to display in the lake a model fleet of the different kinds of sailing craft, so that school children could learn the difference in build and rigging between a ship and a schooner. An eminent educator petitioned that the north meadow should be laid out as a map of the United States, with the chief products of each commonwealth growing in its proper latitude and longitude as an object-lesson in home geography. Half a dozen years ago an elaborate scheme was devised in Boston for locating small insectaries, aquaria and zoölogical collections in different parts of that city park system, with each group of animal life surrounded by the flora of that portion of the world in which it flourished. And since catalogues could never grow as rapidly as these museum collections would increase, it was advised that educated persons in different branches of biology should be stationed near each collection to answer questions and give instruction to visitors.

The trouble is that the zealous people who wish to transform the parks into places for public education and scientific research, or devote them to military parades or to public meetings for the advancement of religion or any

other good cause, forget that the primary purpose of a rural park within reach of a great city is to furnish that rest and refreshment of mind and body which come from the tranquilizing influence of contact with natural scenery. Of course, people, young and old, can skate on the lakes in the winter, and listen to music which is provided in the summer, or play golf or ball where arrangements for such games are possible, but all these additions when they are successful are made subordinate to what should be the controlling purpose in the design and maintenance of such pleasure-grounds. Anything which interferes with the restful quality of the scenery in so far destroys the highest value of the park.

There is no need of offering specific objections to the proposal of President Hubbell. We dissent from his opinion that this growing crop of grain would be "ornamental," and we apprehend that if he would reflect upon this point he would agree with us that a square piece cut out of the turf in the north meadow, for instance, and planted in a checker-board of different colors of grain or stubble would not enhance the quiet beauty of the scenery. But if a beginning was made in this direction, why stop with five patches? Any one can see corn or oats or rye growing in their season within the city limits, and why not add buckwheat, the sorghums and millets, which are not so well known, but which are of growing importance to our agriculture every day. Besides these there are important leguminous forage plants worth knowing, and there are few city boys who can distinguish Kentucky Blue Grass from Red-top. Then there are Flax and Hemp and other fibrous plants, and no end to the different varieties of vegetation which enter largely into the economies of our every-day life. But the simple fact is that a collection of agricultural and economic plants is not a park, and it cannot be made into a park any more than a museum can develop into a library. The ideas are distinct and they may be conflicting. No doubt, education is a good thing, and scientific research is a good thing, but refreshment of mind and body is also a good thing, and it is an especially desirable relief from the nervous eagerness and intensity of the life in modern American cities. Why not leave the parks to furnish this rest, instead of turning them into cheap adjuncts of the university extension movement?

Forestry in Pennsylvania.

WE are too often overwhelmed with discouragement because honest and persistent efforts at disseminating rational views on the subject of forestry seem to produce such meagre results, but it should be remembered that the enlightenment of public sentiment is slow work, and while the fruits of educational labor are not always manifest at once, the seeds of good ideas may nevertheless be germinating for future harvests. Half a dozen years ago no sane man would have hoped that any one of the forest laws enacted by the last Pennsylvania Legislature would pass. But many earnest men and women have been writing and talking and memorializing until a public opinion has been developed which makes almost any good legislation in this direction possible. It is very plain, too, that the report of the Forestry Commission which was published last year has done much educational work in that state, while the influence of its Forestry Bureau, created the year before, has been constantly exercised for good.

The act which will probably give delight to the greatest number of intelligent people in the country is one which creates a great reservation at the head of each of the important rivers of the state, the Delaware, Susquehanna and the Ohio. Each of these reservations contains 40,000 acres or more, and since the bill passed the Senate with only one negative vote, it is more than probable that they will be greatly extended hereafter, and that this measure is the beginning, not only of systematic protection of forests, but of a conservative practice which will provide increasing forest supplies for the future. It

is a significant fact that this bill was introduced into the House of Representatives by an active lumberman, and was supported by others who have made fortunes in the same industry. The Governor of the state, who has showed before this that he is alive to the necessity of forestry reform, signed the bill with promptness and has expressed himself as desirous to be an active promoter of the scheme which the law makes possible.

Another act of equal importance, perhaps, encourages private owners to preserve their growing forests by remitting taxes on such property. The law provides that in consideration of the public benefit to be derived from the retention of timber-trees, the owners of land which carries not less than fifty trees to the acre, each tree being at least eight inches in diameter at a height of six feet above the ground, shall be entitled to receive annually, so long as these trees are maintained in sound condition, a remission of four-fifths of the taxes assessed on such land. Besides these, there are other laws for the suppression of forest fires and for the protection of timber-land from depredation, which are not only good in themselves, but which are particularly significant as indicating the temper of mind which has made such legislation possible.

This action of the Pennsylvania Legislature is certainly most encouraging. It means that the people of that state have learned a good deal in the last ten years on this subject, and the fact that there are now in both houses of the Legislature standing committees on forestry, shows that the will of the people is making ready to express itself in law. It has not been in vain that such an officer as the Commissioner of Forestry was appointed and that a report on the condition of the woodlands of the state has been published and disseminated. This means education, and it is more than gratifying to know that the Legislature has provided for publishing 17,000 copies of this instructive report to replace those which were lost in the fire which ruined the state capitol. The state has begun to frame good laws for the protection, the preservation and the enlargement of its forests. The educational work should be kept up with vigor until an intelligent public sentiment is developed which will enforce all these acts up to the full spirit which inspired them.

Private Forestry and State Forestry.—IV.

IT is apparent that any state action in the direction of forestry will cost money. But the investment is sure to be profitable, partly through the influence of forestry on climate, water-supply, etc., partly by the annual growth of timber on the state lands.* I would not advise, in general, any haste in harvesting tree-growth from the state forests. The reason lies in the condition of the lumber industry. This great branch of the national resources must be preserved. That industry is now taking the timber from private lands. Opening such parts of state forests as are well timbered to axe and saw would tend to reduce the value of the stumpage of trees, and the destruction of forests would be accelerated. State forests as well as private would become bare of high-grade timber trees after the lapse of a few decades. But it goes without saying that a small part of the state forests might safely be put under economic forest management at an early date in order to gather experience.

The golden rule of state forestry at this time is, "Be quick in securing forests, firm in protecting and slow in using them."

Economic forest management cannot be established at a trifling expense.† Apart from the outlay for forests and

foresters, a large sum must be spent for the creation of more permanent means of transport, such as wagon roads, pole roads, tramways, flumes, cable roads, etc. There is one method of transportation, however, that should not be adopted, namely, that of driving logs down to the floatable rivers by means of splash dams. Clearing the creeks for a splash means doing away with any obstacles or obstructions to the watercourse. For obvious reasons this should be avoided under state forest management. Any clearing of creeks accelerates the collection and downflow of precipitations. Such forestry, instead of preventing floods, would facilitate them; instead of regulating the water-supply it would endanger its regularity.

Another outlay to be incurred before economic forest management can begin is for a working plan. A working plan is a report consisting of two parts. The first part is a description, based on a topographical map of the growing stock, its productiveness, the existing and the possible means of transport, the most economical use to be made of the products, and the possible methods of regeneration. The second part is a plan of future operations, so arranged as to apportion the expenses and revenues over a series of years. It indicates what parts of the forest are to be cut over first; what parts, if any, are to be improved; what parts, if any, are to be replanted; what roads, etc., are first to be made. This work is not as inexpensive as might appear at a first glance, especially in a country in which forestry is entirely new. Mistakes at starting are unavoidable, but their number and importance can be lessened by laying down a well-considered working plan, and the larger the total area the smaller will be the expenditure per acre. A network of footpaths must be traced out as an aid to the work of protection, and, where necessary, occasional strips should be kept free of combustible matter. Of course, under favorable conditions, the expenditure for establishing economic forest management will be small. Where there are railroads or rivers running through the heart of the district, where timber can be hauled to the railroad or river on sledges, where there is a road system, where there are maps of sufficient accuracy, where there is a tolerably uniform growth of timber, it is easy to establish economic forestry. Beware, however, of plunging into forest work; in forestry, mistakes once made can only be corrected, if ever, after the lapse of a tree's life.

There is no need of stating that forest management can scarcely be expected to furnish an immediate revenue in districts where lumbering does not pay. Even in such districts, however, there is some return from forest protection; it is dormant, latent, it is not in available cash, it is added to the original stock of capital without any possibility of separation from it. The return consists in the improved quality and increasing value of the growing stock and of the soil. In a country in which the value of stumpage is rising rapidly, forest preservation is sure to pay.*

I am not sure that I have expressed my convictions in the forest question with sufficient clearness, and should like to summarize the principal points:

State forestry must come into play where districts administered solely with a view to the highest money return have ceased to act as a "barrier against losses."

Private forestry † in this country can be made remunerative, and therefore feasible, under a certain set of circumstances (a reduction of taxes on second growth and a protection against fire by state guards), the creation of which is the duty of the Government.

Biltmore, N. C.

C. A. Schenck.

* Report of the United States Division of Forestry, 1892, page 307.

† There is a peculiar kind of private forestry already in existence here and there, which might be called park forestry. Park forestry, for landscape purposes, or for the sake of game preservation, voluntarily sacrifices a more or less considerable share of the money return attainable under exclusive economic forest management. It allows some trees to stand that ought to be felled and sold, and that merely because they are picturesque or because they bear seed which affords food to the game. Park forestry builds roads, not merely to facilitate the transport of forest products, but also to furnish pleasant drives and rides. It goes to the expense of planting varieties of trees in places where regeneration from self-sown seed would cover the ground in the course of time. It further allows the deer to nibble off the young shoots of trees. Such management is forestry because its main object is the forest. But it is not economic, financial forestry.

* The forest guards acting as fish and game keepers at the same time, in many cases considerable revenue can be derived from fishing and hunting leases. The leases should run for a score of years and should comprise one or two ranges each. Their wording should be such as would warrant the maintenance of a suitable stock of both game and fish, under the control of the rangers. There are plenty of sportsmen in the United States who will gladly pay as much money for the exclusive right of fishing and hunting on a reserved range as the annual salary of the ranger amounts to.

† Report of the United States Division of Forestry, 1892, page 314.

Pomegranates and Oleanders in California Villages.

NOVELISTS, when arranging their scenery, are apt to describe all villages as embowered in roses. As a matter of fact, hardly two villages in this state are similar in the character of their gardens, because soil, climate, situation and many curious accidents determine the kind of beginnings these gardens make and the lines of their development. Some of our mountain towns are noted for their Asters, others for their Dahlias, their Campanulas, their Balsams or their Carnations. One old mining camp grew to be a maze of white Lamarque Roses long before it was deserted. A little river-crossing in Shasta, where three or four log cabins clustered together, was once as fine a Geranium garden as America could then show. But I have been particularly interested in the use that is sometimes made of easily grown shrubs, cuttings of which are passed from neighbor to neighbor until the whole district has one characteristic garden plant. Among such are the Pomegranate and the Oleander.

There is a little town of the Sierra foot-hills named Ione, in Ione Valley, Amador County. Mountain streams and irrigation ditches cross it, and great groves of Oaks give dignity to the landscape. The pioneers planted many Apple, Pear and Cherry trees in irregular groups near the streams, so that one sometimes sees very large specimens of these fruit-trees, unpruned and neglected, but still bearing crops. The newer orchards and vineyards are much more profitable, though not half so attractive. The heart of the valley is almost a swamp. Giant Willow-trees, expanses of Marsh Grasses and Cat-tails, with impassable thickets of wild Blackberry vines, form a strange contrast to adjacent hills of white or red clay thickly clad with various species of Rhus, Ceanothus and Manzanita, with here and there a solitary Pine, the sentinel of some peak. The comparative isolation of the valley seems to have developed neighborliness and touched all Ione's gardens with an air of fellowship. Years ago, as one plainly reads the story, some one must have brought a scarlet-flowered Pomegranate from Sacramento and planted it. Cuttings were freely distributed, so that now, as I rode through the town in early June, I could not but admire the predominant Pomegranate color. Almost every garden has this royal shrub, standing in many cases twelve or fourteen feet high, and loaded with flowers, and fine specimens guard gateways or make the centrepiece of many a sheltered, sunny lawn, under the bluest of blue skies.

There are other foot-hill villages of California noted for especial flowers, the charm of which will long linger in one's memory. "There's them flowers you call Oleanders all over Douglas Bar," said an old pioneer woman to me up in Trinity County. "When me an' my ole man druv out here from Missouri I carried one in a tin can and watered it every day. Then, when we settled down in this camp, I rooted slips in bottles for everybody that wanted them. We didn't hev eny other kind of flowers except the wild ones till we got a schoolhouse. Then the teacher brought some Marigolds over the range. Next we hed a white Rose thet grew from a slip thet the stage-driver brung from Shasta. We thought it was awful pretty. 'Bout the time the war began we got some Morning-glory seed, and now, ef ye find one of these Oleander-bushes eneywhere in a cañon all by itself, look 'round, and close by there'll be the wreck of an ole cabin, a chimblly, or mebbe a gravestun, to mark some forty-niner's home. Some of them very bushes that I rooted in bottles is growing thirty miles away in the brush, with nobody left 'cept me to say anything about it."

Douglas Bar was a mining village beside the Trinity River, in the midst of Pine forests, and though it had many quaint and sweetly old-fashioned flowers in its sloping and terraced little gardens by the time I first saw it, the one preëminent floral fact was that Oleanders grew there in riotous profusion, as single tall specimens, as hedges, in clumps and masses of royal color to which everything

else was subordinated. No one in Douglas had ever had the moral courage to own a garden without an Oleander. But this simple, oft-repeated element gave the visitor a pleasure hardly to be put into words; it glorified the land all summer long even more than those scarlet Pomegranates glorify the valley of Ione.

Niles, Calif.

Charles H. Shinn.

The Agricultural Prospects of Alaska.

THE recent action of the Department of Agriculture, in sending a commission to Alaska to examine into, and report upon, the agricultural prospects of our northern province, may possibly have the effect of causing some people to infer that farm products can be grown successfully there, and for the information of such I give my experience while a resident there. Having lived for five seasons in Alaska, I would say that in my judgment the territory is wholly unsuitable, and in the nature of things must always remain unsuitable, for agriculture in the proper sense of that term. This unfitness is neither due to cold nor to the northern latitude, as most people suppose; on the contrary, the climate is very mild between the coast range and the ocean—the temperature at Sitka not being very materially lower than that of Portland, Oregon—while the long summer day of northern latitudes compensates for the shortness of the season. The two causes that militate against agriculture in the territory are paucity of soil and humidity of climate.

The lack of soil is remarkable. The surface of the country is generally a mass of moss-covered rocks, from the seashore to the mountain sides, the only exceptions to this rule being the sphagnum marshes, which are too wet to produce cultivated crops; the alpine meadows, which are too elevated for this purpose, and the few deltas and alluvial strips which have been deposited about the mouths of the larger streams. The latter and a few humus-covered spots on the shores of some of the bays and inlets are the only places available for agriculture in the whole territory. Where these patches have a south-western exposure and are properly drained, or the slope is sufficient for them to drain naturally, the long summer day of the region is so favorable that garden vegetables can be raised to some extent, but the raising of hay or grain is out of the question; it could not be harvested owing to the humid climate, even if it could be grown successfully.

As many persons may be desirous of knowing just what can be grown successfully, I herewith give, in alphabetical order, my experience with various grains, grasses and vegetables:

Barley does not ripen. Beans (Snap) do well. Beets give good results if the soil is drained. Cabbage can be raised, but it will not head. Carrots can be grown fairly well. Cauliflower does well in a dry season, but the heads are small. Clover I did not succeed with, possibly because the spot on which I tried it was unsuitable. Corn does not ripen at all, and only produces an abortive grain. Fruits (native) nearly all yield an abundant crop; the native Strawberry only does well on sandy spots, either alluvial or glacial; Salmon-berry, *Rubus spectabilis*, grows luxuriantly; Cloud-berry, *R. Chamæmorus*, is generally plentiful on the sphagnum marshes, but is occasionally caught by frost and proves a failure; the five native Huckleberries, *Vaccinium parvifolium*, *V. ovalifolium*, *V. arbuscula*, *V. sp.* and *V. sp.*, are excellent and of fine flavor and always yield a large crop; the Cranberry, *Vaccinium Oxycoccus*, is scanty; the high bush Cranberry, *Viburnum pauciflorum*, is abundant and good; the Currants, *Ribes acrifolium* and *R. bracteosum*, yield a large crop, but are not of good flavor; the Service-berry, *Amelanchier alnifolia*, is scarce, but good, and the native Crab-Apple, *Pyrus rivularis*, is only good in favorable seasons.

Of the introduced fruits the Currant and Gooseberry are the only ones I found worth trying, but it is quite possible that some of the early varieties of Apples would do well if

grafted on the native Crab-Apple; just as the introduced Cherries in Oregon, when grafted on the native wild Cherry, *Prunus mollis*, excel any grown on their own stock.

The Grasses all grow luxuriantly and make excellent forage; the opinion expressed by some that cattle will not eat the native grasses is a mistake, the plants which they reject being some of the Sedges (*Juncaceæ*), which many people do not distinguish from the true Grasses. Lettuce does remarkably well, and by sowing at intervals it can be had ready for use the greater part of the season. Oats will ripen, but cannot be harvested. Onions will not do well when grown from seed, but when grown from sets produce very acceptable "green onions." Parsnips grow fairly well, but are small and not of first-class flavor. Peas of the early varieties do remarkably well, and far exceeded my expectations. Potatoes, though very late in sprouting some seasons, grow rapidly, and when planted in well-drained soil give a fairly abundant crop and of fine flavor. They have been cultivated for a century or more by the Indians (*Haidas*) on Prince of Wales Island. Radishes proved to be excellent, and when sown at intervals can be used all through the season. Rhubarb grows abundantly, but not of quite as good a flavor as when grown farther south. Rye will not ripen. Timothy grows luxuriantly, but cannot be harvested. Turnips, though not large, proved to be a good crop and of fine flavor. Wheat grows a good straw and well-developed head, but will not ripen, and could not be harvested if it did mature on account of the prevalent rains and continuous cloudy weather.

The quantity of rain which actually falls does not give a non-resident a proper idea of the impediments to agriculture in the territory, as the number of rainy days in proportion to the amount of rain is much greater than in the middle or eastern states, while the proportion of cloudy days and the consequent difficulty of harvesting a crop is still greater. To better illustrate this fact I submit the following record of precipitation and number of rainy days during the months of June, July and August for the years 1892, 1893, 1894 and 1895:

	1892.		1893.		1894.		1895.	
	No. of rainy days.	Rain in inches.	No. of rainy days.	Rain in inches.	No. of rainy days.	Rain in inches.	No. of rainy days.	Rain in inches.
June	19	3.62	22	4.60	21	3.57	21	6.77
July	23	6.81	22	9.26	20	8.97	17	5.85
August	28	10.61	24	12.70	19	9.49	26	8.68
Total for three summer months	70	21.04	68	26.56	60	22.03	64	21.30

This, however, being only for the three summer months, is still considerably below the average annual precipitation, which is 111.72 inches.

Even if the region was fully soil-covered, the surface of the country is so precipitous and uneven, and the annual rainfall so great, that the soil would soon be washed into the gulches and ravines if the hillsides were once denuded of their forest covering. The forests, while containing some valuable timber, such as the Tideland Spruce (*Picea Sitchensis*), Pacific Red Cedar (*Thuya plicata*) and Alaska Cypress (*Cupressus Nootkaensis*), are not nearly as extensive as many people suppose, and in any event will only be sufficient to supply the local demand.

In conclusion I would say that the territory can never, under any circumstances, be a field for the farmer, and, although the grasses are abundant and nutritious, it cannot be utilized for stock-raising, owing to the long winters.

Its only industrial possibilities are for the miner, the salmon-canner and the fur-hunter.

Portland, Ore.

M. W. Gorman.

Among works of art of every class statues most rarely give permanent satisfaction, and if they are awkward, ungraceful or unsuitable for the situation in which they are placed, none are so obtrusive and unsatisfactory.—*Calvert Vaux*.

Foreign Correspondence.

London Letter.

WATSONIA IRIDIFOLIA O'BRIENI is now finely in flower in an unheated frame at Kew, the spikes being over a yard high, and the flowers two inches across and snow-white. It is in every sense a first-rate garden plant and should prove a profitable investment for growers of bulbs for the wholesale market. It is better than many *Watsonias* in its behavior under cultivation, for it has flowered every year at Kew since it was first obtained in 1891. I have already described it fully in *GARDEN AND FOREST*, but I may repeat here that it is very similar to *W. rosea* in general appearance, with larger flowers than any other *Watsonia*, and very fragrant. I have seen spikes of it four feet high with five or six branches and bearing from thirty to forty flowers open at one time. It ought to be a good plant for forcing to flower in spring. *W. Ardernei* is another name for it.

STENOMESSON AURANTIACUM.—This is an elegant summer-flowering bulbous plant which until lately has always been grown in pots under glass, but which has proved quite at home in an outside border against a warm house, where it is now flowering nicely. It has globose bulbs about an inch in diameter, linear oblong leaves produced along with the flowers, scapes from nine inches to a foot high, each bearing an umbel of about six flowers, which expand in succession, two or three being open together; they are nodding funnel-shaped, an inch and a half long, and of a rich orange-red color. It grows in the Andes of Ecuador at an elevation of 13,000 feet. The *Coburgia* section of *Stenomesson* includes several beautiful flowered species, which, however, are somewhat difficult to flower under cultivation, although they grow and multiply freely enough.

HELICHRYSUM ROSMARINIFOLIUM.—There is no more attractive shrub in June than this in the warmer parts of the United Kingdom. In Ireland, especially the south and west, it forms a bush six or eight feet high, and when in flower it resembles a snow-laden shrub; hence the name by which it is called there, namely, Snow in Summer. It is now flowering well against a wall at Kew, having withstood the comparatively mild past winter; as a rule, however, it is either killed or cut down to the ground by the winter cold experienced at Kew. It is better known, perhaps, by the name of *Ozothamnus*. It is a native of Van Dieman's Land and was introduced into England about seventy-five years ago.

OSTEOMELES ANTHYLLIDIFOLIA.—This plant passed through the cold of last winter uninjured in a sunny position against a wall, and is now bearing numerous clusters of white May-like flowers. In countries where it would be quite hardy—it is not hardy at Kew—it forms an elegant bush or small tree with thin branches, pinnate leaves, more or less persistent, and flowers which in size of umbel, arrangement and color are not unlike those of the *Amelanchier*, to which genus *Osteomeles* is closely allied. Although well known to botanists as an interesting shrub of remarkable distribution, it was not introduced into cultivation until about five years ago. It is easily propagated from cuttings and it forms a nice pot-plant for the cool greenhouse. A second species, as yet unnamed, has lately been introduced into the *Jardin des Plantes*, Paris, and from thence to Kew.

CEDRUS ATLANTICA AUREA.—This well-known variety of the Atlas Cedar was well shown before the Horticultural Society by Messrs. Veitch and obtained a first-class certificate. In soils suitable to it, this golden-tinted form is likely to prove an attractive conifer and a worthy companion to *Cedrus Atlantica glauca*, of which there are some beautiful specimens in English collections.

CELMISIA MONROII.—I lately noted this as being in flower at Kew. Some plants of it were exhibited by Messrs. Veitch & Sons at the last meeting of the Royal Horticultural Society, where it was awarded a first-class certificate. It was looked upon as a new introduction by most of those who saw it.

Fig. 34.—*Lonicera gracilipes*.—See page 266.

1. A flowering branch, natural size. 2. A fruiting branch, natural size. 3. Longitudinal section of a flower, enlarged. 4. A fruit cut horizontally, enlarged.

ROSES.—Collections of single and semidouble Roses are now frequent features of our plant exhibitions, and I am told by the nurserymen that these forms are growing in popularity at such a rate that it is difficult to supply the demand for them. The Penzance Briers have, no doubt, had some-

thing to do with this run on single Roses, and the large collection of all kinds of species and first crosses of Roses cultivated at Kew has, no doubt, also had some influence upon horticultural taste in this respect. The Rose garden at Kew—a large sunken area laid out with tree-roots with

grass walks among them, planted with masses of all kinds of showy species and subspecies—is now a great attraction. Nothing could be finer than Crimson Rambler, Carmine Pillar, the various forms of *Rosa lutea*, *R. Indica*, *R. damascena*, *R. involucrata*, *R. moschata* and *R. rugosa* when planted in bold masses either as in this Rose garden or in conspicuous places on lawns.

VANDA AGNES JOACHIM.—This is a hybrid raised at Singapore a few years ago from *Vanda teres* and *V. Hookeri*. It was named and described by Mr. Ridley, and afterward passed into the collection of Sir Trevor Lawrence, by whom it was shown in flower at a meeting of the Royal Horticultural Society, receiving a first-class certificate. Apparently it has inherited the robust free habit of *V. teres*, and shows none of the spindliness of the other parent. It bore a spike nearly two feet long carrying nine flowers and buds, which are like those of *V. teres*, but the lip has a larger midlobe, and the color of the whole flower is of a softer pink, with tinges of purple and yellow. It cannot be considered much superior to *V. teres* as a garden plant, but it is interesting as being the first hybrid *Vanda* raised artificially.

LARGE-FLOWERED CATTLEYAS are becoming abundant. They were numerous at the Temple Show, and at the last meeting of the Royal Horticultural Society four new ones obtained certificates. The names of these are noteworthy: *Lælio-Cattleya Dominiana*, var. *Empress of India*; *L.-C. Our Queen*; *Cattleya Mossiæ*, *Empress of India*, and *C. Mossiæ*, *In Memoriam*, Richard Curnow. The last-named is, perhaps, the largest variety of *C. Mossiæ* known, and its colors are equally rich and striking. It was shown by Messrs. H. Low & Co., and the name is intended to commemorate one of their collectors. Among other good *Cattleyas* with bad names exhibited at this meeting were *Lælio-Cattleya Canhamiana Langleyensis*, *L.-C. Canhamiana*, var. *Sappho*, and *L.-C. Canhamiana*, var. *Iolanthe*. Judging by the large number of handsome forms of *C. Mossiæ* which have been exhibited in London recently, some new collecting ground must have been discovered for it. There is no more beautiful *Cattleya* than a good *C. Mossiæ*.

London.

W. Watson.

New or Little-known Plants.

Lonicera gracilipes.

THIS bush Honeysuckle is a native of Japan, where it is not uncommon on the borders of mountain forests in central Hondo, and has been cultivated for ten years in the Arnold Arboretum, where it is perfectly hardy and has attained the height of four feet, forming a broad vigorous shrub.

*Lonicera gracilipes** (see fig. 34, on page 265 of this issue, made by Mr. Faxon in the Arboretum) is a shrub with erect stems and spreading branchlets at first pale yellow-brown and conspicuously enlarged at the nodes, and at the end of two or three years becoming dark gray or grayish brown. The leaves are broadly ovate, rather abruptly contracted into short points, entire, thin, light green on the upper side, pale and glaucous on the lower, from an inch to an inch and a quarter long and from three-quarters of an inch to nearly an inch broad, with slender pale midribs, few obscure primary veins connected by conspicuously reticulate veinlets, and slender peduncles enlarged and clasping at the base and about an eighth of an inch long. The flowers, which appear as the leaves begin to unfold toward the end of April, are solitary or in pairs on slender nodding pedicels half an inch in length, their bracts being as long, or rather longer, than the calyx, which has a short nearly entire border; the corolla is white or pale straw-color, with a slightly gibbous tube gradually enlarged into the spreading reflexed acute lobes,

and about three-quarters of an inch long. The fruit ripens early in June, and is oblong, one-third of an inch long, light bright blue and suspended on slender nodding stems.

Lonicera gracilipes is occasionally found in American and European gardens under the name of *Lonicera* or *Zelostium Philomella*.

Plant Notes.

DIERVILLA JAPONICA.—Many of the garden *Weigelas* bear abundant flowers of good color, ranging from a dark wine-color to pure white, but somehow the habit of these shrubs is stiff, and they do not seem to mingle well with other shrubs. In our last volume (see vol. ix., p. 405) we figured *Diervilla Japonica*, which was raised from seed gathered by Professor Sargent from wild plants in various parts of central and northern Japan. It is a common shrub by the banks of streams and along the borders of mountain woods. Here well-grown individual plants reach a height of fifteen feet and a diameter of from ten to twenty feet. This species is the only one which Professor Sargent saw, and he is inclined to believe that the three species of *Maximowicz* must be reduced to this one, which varies much in size in the pubescence of its leaves, in the number of its flowers and the length of the peduncles of its flower-clusters. It is from different types of this wild species, perhaps, that all the garden forms have been derived. It is easily propagated, and it has been flowering for three weeks past in the Arnold Arboretum and along the Boston parkways. Certainly it is a more graceful shrub than the *Weigelas* of gardens as we know them, and it can be unhesitatingly commended for park planting. The flower-clusters are sometimes long-stalked, and sometimes nearly sessile, and they are rose-colored, yellow, dark red or nearly white on the same plant, since the flowers which are very pale when they open turn darker as they fade.

Cultural Department.

Cultivation of the *Calochortus*.

THE various species of *Calochortus* have been coming into flower since early June, and now, at the end of the month, are in their best form. These native plants seem to be much neglected, though they are among the most distinctly and beautifully flowered of bulbs. It is probable that many who have ventured to grow them have been disappointed in results, for the cultural directions of catalogues are usually hazy or else incorrect. They also often recommend cultivation in frames, or other conditions which deter most growers from attempting their cultivation. My experience with all the species is that they are not tender nor at all difficult to flower in this latitude in an ordinary garden border. I have tested them for several years and sacrificed my first collection to satisfy myself as to what they would or would not survive. One should hesitate in offering any hard and fast rule for the cultivation of plants, for they can often be grown under widely differing conditions. *Calochortuses* grow naturally in regions rainless in summer, and where dormant plants waken into growth in the fall under the influence of moisture, but not necessarily of a high temperature. They are hardy here without protection, but must be classed with those bulbous plants whose foliage will not endure always the rigors of our winters. The successful growth of such bulbs requires that, after being thoroughly ripened in the early summer, they shall be kept perfectly dormant so late in the year that no foliage can appear above ground until early in the ensuing spring. The simplest and safest procedure is to lift the bulbs after the ripening foliage indicates dormancy and store them in dry earth in a warm dry place, and plant out when the ground has lost its warmth, which in this locality is in November. Under such treatment they grow and flower well here, even in soil too hard to work in dry weather, and with no other attention than that already suggested. Of course, one does not plant bulbs in manured soil or in soil rich in humus, which will hold water and ferment to their injury. In the state of nature many bulbs seek the depths evidently to escape detrimental surface humus, a desire to shun bad company, which is not always shared by human beings. *Calochortus* bulbs, if left in the ground here,

* Miquel, *Versl. Med. Acad. Wetensch.*, ser. 2, ii., 85 (1868); *Procl. Fl. Jap.*, 158.—Franchet & Savatier, *Enum. Pl. Jap.*, i., 205.—Dippel, *Handb. Laubholz*, i., 257, t. 170 (a sterile shoot only).—Koehe, *Deutsche Dendr.*, 545.

may or may not survive the summer if the soil is not too wet, but the safe practice is to lift them.

There are more than a score of species. From a garden point of view they may be divided into two sections—the Star Tulips and the Mariposa, or Butterfly Tulips. The former are free-growing plants, many-stemmed and bear a profusion of small flowers, with petals closed into irregular globes. *Calochortus pulchellus* (yellow), *C. albus* and the red form, *C. amoena*, are the best trio. The Butterfly Tulips are entirely different in habit and form, and find their most distinct expression in the white and roseate flowered kinds, as these are spotted and lined with the butterfly markings, from which they receive the popular name. The markings are quaintly beautiful in dull reds, browns, yellows and green, sometimes in eye-like forms, at others in a few bold lines sketched, as it were, on some part of the broad petals, mostly on the base, but sometimes in the centre. Markings of similar character are also found on the very narrow green sepals. The flowers are three-petaled and about three inches in diameter, borne about twelve inches high on thin stems. The foliage is narrow and scanty. A good selection of these would be *C. venustus cœnlatus*, *C. pictus*, *C. venustus roseus* and *C. Eldorado* (rose).

Of the yellow self-flowered kinds, perhaps, the best is *Calochortus luteus*, var. *concolor*, a deep golden flower and a vigorous species. There are also many purple forms, mostly self-colored or slightly shaded, which do not appeal to me as favorably as the others, though there are spotted kinds. The best is probably *C. splendens*, a lilac-colored form, which has finely dented petals and the base of the cup filled with hair-like growths. Many of the *Calochortus* have these growths, but none, I think, in such profusion. Probably the specific name of this species refers rather to some one's botanical enthusiasm than the gratification of his color sense. *C. Catalinæ* is a distinct kind, the white petals being flushed with purple on the outside. *Calochortus* seem to be attractive to a number of different insects, and they bear seeds freely. *C. Plumariæ* seems to be a late-flowering species.

Elizabeth, N. J.

J. N. Gerard.

The Abelias.

THERE are some half a dozen species belonging to this genus, with one or two varieties, natives of northern India, Japan, China and Mexico, where one species grows at an elevation of 10,000 feet above the sea-level. *Abelia rupestris*, introduced by Robert Fortune from China nearly fifty years ago, is the species best known in this country, where it is frequently called *A. floribunda*, the name of a red-flowered species from Mexico. *A. rupestris* has flowers about an inch long, and white, the two lower divisions of the corolla being faintly tinged with pink. The calyx is of a brick-red color, and at certain times of the day the flowers are delicately scented. Although in this latitude *A. rupestris* will commence blooming by the latter part of June, it keeps on unfolding its flowers late into November. It would be hard to find a more desirable decorative shrub. It can be grown to form a perfect hedge or a compact specimen on the lawn when kept free from other things, or it may be had in long graceful branches by allowing the strong shoots to develop and by removing the twiggy growths at the base of the plant. For grouping in city parks and for cemetery use its long period of flowering should alone recommend it. The species is, without doubt, quite hardy in this vicinity, as plants which were put out by Downing are yet in a flourishing condition and promise to remain so for years to come. When we have the thermometer registering a few degrees below zero it is untouched, save in the shedding of its foliage, which in ordinary winters is evergreen. At Philadelphia I understand it stands out without protection, and at Mr. C. A. Dana's place, on the north shore of Long Island, it thrives with a little protection in winter. There is a variety of *A. rupestris* called *grandiflora* which has larger flowers but fewer of them.

The Mexican *Abelia floribunda* is at home on the peak of Orizaba, 10,000 feet above sea-level, and on the Cordilleras of Oaxaca. Although it has withstood several winters here it cannot be recommended for situations farther north, but for the southern states it ought to be an admirable plant. It has pendulous flowers about two inches long, rosy purple in color, and it blooms at an earlier period than *A. rupestris*; but there are enough scattering flowers all through the summer to make the plant attractive.

Abelia triflora is a native of the western Himalayas, where it flourishes at an altitude of 9,000 feet. It forms a very pretty little shrub with whitish yellow and pink flowers in clusters at the ends of the branches. It is quite hardy with us, and so are *A. serrata* and *A. uniflora*.

The most successful way of propagating these plants is by cuttings taken just after the wood is ripe in the fall. Flowering shoots with the ends cut off make good cuttings, which can be rooted in a cool frame or propagating-house.

Botanic Garden, Washington, D. C.

G. W. Oliver.

Irises in Late June.

THE English Irises closely succeed the Spanish kinds and keep up a succession of attractive flowers. As is well known, these bulbous Irises are not English, but Pyrenean, and gained their name in Holland because they were introduced through the former country. The bulbs of this species are longer and rougher than those of the Spanish varieties. The leaves are wider and the flowers are larger in all their parts. They are white and all hues of purple from blue to red, and their effect is distinct from that of the brighter-colored Spanish Irises. The white-flowered form, known as *Mont Blanc*, is the choicest of this species, for it seems to be a true species. Shortly after the middle of July appear the Japanese Irises; as the hybrids of *I. lævigata*, or *Kämpferi*, have come to be known. The type of this species is a blue-purple, and, as is frequent in wild plants, a white-colored form. These Irises as imported have usually the same characteristics of flower and foliage, though the Japanese offer as a type form one with shorter and broader leaves. This may possibly be the form lately noticed in an importation and separated by Baker as *I. albo purpurea*. It is curious that though some fine forms of *I. lævigata* were sent here by Mr. Thomas Hogg soon after the Japanese treaty ports were opened many years ago, they did not meet with general appreciation until a few years ago. The type has evidently been broken for many years, and besides the typical forms there will now be found those with colorings through the entire gamut of purples from the blue to the dull-red end of that spectrum. They also appear in self and mixed colorings, the mixtures being in spots and reticulations usually. There are also single and double forms, which furnish altogether an extensive field for variation and a decided choice. As a rule, with their ordinarily sombre, dull colorings the thin large flowers, floating, as it were, and well raised on tall stems above the narrow foliage, are very effective in garden groups. Some of the forms, especially those which are double and splashed with varied colorings, do not seem to me great gains, and, like a good many other latter-day Japanese articles, seem to be produced to cater to the present department-store standard of taste. I notice that one of this type is frankly named in the catalogue, "Maple leaves spoiled by rain."

Elizabeth, N. J.

J. N. Gerard.

Flower Garden Notes.

ALTHOUGH semi-tropical bedding plants are not making a rapid growth, owing to continued cool nights, the weather in May and June suited most plants exactly. Perennials of all sorts have made remarkably vigorous growth, the frequent copious rainfalls during the past six weeks having been just what they needed. We have recently gone through our beds of herbaceous stock and securely staked all the plants which required it, and carefully hand-weeded the beds at the same time. Seed-pods of *Papaver orientale* have been cut off, and of a few other plants which become nuisances if allowed to seed without restraint, and bare spaces of ground have been lightly stirred with a hoe. Now that warm and dry weather is setting in, the advantages of leaving on the old manure which covered the beds during early winter and of not wheeling it away or digging it into the ground are apparent; beds with a mulching of this sort can stand quite a severe drought without suffering. Perennial borders usually have a somewhat seared and dilapidated appearance after the middle of July, when *Pæonias*, Irises and many other showy flowers have waned, but *Zinnias*, *Dianthus*, *Gaillardias* and numerous other bright annuals among these plants make the beds a mass of color from the latter part of May until they are cut down by frost.

Seeds of such biennials as Sweet William, Canterbury Bells, Antirrhinums, Wallflowers, etc., have been recently sown, and will be kept well watered until they germinate. When large enough to handle, these are pricked off in nursery rows a foot apart. *Coreopsis grandiflora* is one of the best hardy plants grown for cut flowers, and a sowing of it may be made now to advantage. We lift and pot a number of these plants late in the fall and force them into bloom by the middle of May; they are particularly acceptable on Memorial Day, when bright yellow flowers are rather scarce. Pansies we sow early in August, and find *Trimardeau* the best all-round variety. This season

has suited Pansies better than any I can recall. Hollyhocks should have been sown before this time, but it is not too late to do so now.

Beds of tender-flowering and foliage plants require some attention each week to keep them attractive. Seed-pods and decaying foliage from Cannas, faded flower-trusses from Geraniums and the tops of many foliage plants should be removed, while the surface soil should be kept stirred and all grass verges trimmed. No flower-bed can look well if the verges are poorly kept, but this neglect is often noticed in private and public grounds. Cannas, to be at their best, should have copious waterings in dry weather, as they are semi-aquatic, and a scattering of fertilizer over the beds occasionally will help in the development of superior flower-spikes. The new Italian varieties, Austria and Italia, are very robust growers and flower freely, but the flowers are rather flimsy. Burbank appears to belong to the same class; it is, however, a grand yellow flower.

Hardy Roses of all sorts have produced capital flowers this year, the cool, showery weather bringing them on finely. Many of the old hybrid Perpetuals raised a generation or two ago still lead as the most popular and profitable sorts. Some varieties of more recent introduction are, however, great acquisitions; specially good are Clio, Marchioness of Londonderry, Captain Hayward, Earl of Dufferin, Margaret Dickson, Mrs. Paul and Helen Keller, all of which are reliably hardy here and possessed of good constitutions. The flowering season is now nearly past, and all faded blooms should be removed; also any Manetti or Brier shoots, which rob the plants of much vitality if allowed to remain. Crimson Rambler, one of the most charming pillar Roses ever introduced, is now a mass of bloom. If the new French varieties, Thalia, Aglaia and Euphrosyne, which we are trying, prove hardy and equally satisfactory as white, yellow and pink varieties, they are bound to become extremely popular. Mr. W. A. Manda, who has already sent out some pretty Wichuraiana hybrids, recently exhibited in Boston some crosses between Rosa Wichuraiana and Madame Hoste and Perle des Jardins which were deemed worthy of first-class certificates. Mr. Manda says these crosses are thoroughly hardy, make rampant growth and are very floriferous.

Carnations grown expressly for summer blooming are now beginning to flower freely and have recently been staked up. The winter-blooming stock must be looked over weekly and necessary topping done, the ground kept well stirred and all weeds growing near the plants carefully pulled up by hand. Violets look remarkably well thus far and are now commencing to make runners, which should be removed once in two or three weeks. Our last sowing of Asters and Stocks was made toward the end of June. The plants of the first sowing of Asters, Queen of the Earlys, are now well branched and will soon furnish flowers for cutting. Gladioli we plant in several batches for a succession of cut flowers. The last lot has just been put out, and these are useful during September and early October. If Sweet Peas have not already been mulched some suitable covering should be given them; seaweed, grass or short spent manure answer equally well. It should be remembered that they love to be moist at the root, and that to prolong the flowering season none of the flowers should be allowed to go to seed.

Taunton, Mass.

W. N. Craig.

Correspondence.

Licorice Root.

To the Editor of GARDEN AND FOREST:

Sir,—Your brief allusion to licorice root on page 253 hardly indicates the magnitude of the trade in this commodity. It really comes to this country in cargo lots, and you may be interested in a few facts well known to the trade and which have been published at different times in various pharmaceutical journals.

Until less than thirty years ago Spain was the main source of supply for this country. Persistent collecting has almost exterminated it in some sections of that country and much of the limited quantity now exported is of small and fibrous roots skillfully assorted and packed with the few larger ones to make the best effect. The Spanish licorice is sweeter than any other, and is specially valued for use in lozenges and pharmaceutical preparations. The extract of the root boiled down and evaporated is familiar to us in rolls an inch or more in diameter and about eight inches long. A test of purity in this form is its solubility in water, but adulteration is common. Potato starch and other farinaceous substances are used, with sugar, in licorice confectionery. The root from Sicily ap-

proaches that from Spain in its mild and sweet qualities, and the Italian roots yield the richest extract.

Immense tracts in Russia and Asia Minor are covered with the Licorice-plant, which is regarded by farmers as a nuisance to be cleared away before the ground can be used for agriculture. The trade in licorice began in Russia about twenty years ago, and the plains of that country offer an almost unlimited field for collectors. The Caucasus Mountains are also a favorite collecting ground, and uncultivated districts in Turkey and Greece, for all the licorice of commerce grows wild. Greek root is a name popularly given in the trade to all licorice root except the Spanish. The saccharine and starchy properties are affected by the soil, and also the color of the root, which is yellowish, reddish or brown. The tap-roots of one kind of Licorice extend three to six inches downward, and of another sort to but half that depth, the latter being, of course, more easily gathered. The digging begins in autumn after the rains have set in, and the same ground yields a crop once in three years. In Russia, now the principal exporting country, the collecting is done by natives of the peasant class in the section between the Black and the Caspian Seas. The roots are delivered at local stations, cleaned, some of them peeled, dried, packed and carried by rail to the seacoast. Large factories for curing the green roots and for extracting the juice are operated in Transcaucasus by English capitalists, and the largest of these each have a yearly output of 5,000 tons, or above 10,000,000 pounds. So heavy is the trade that a fleet of vessels is employed on the Black and Caspian Seas in transporting licorice alone.

The Russian roots and those from all that part of Europe and from Asia Minor have a slight acidity, and are used mainly for flavoring tobacco and various drinks. The price of these is considerably less than that for Spanish roots, and mature first-grade roots from Spain command twice as much. Like Ginseng, this root is highly esteemed by the Chinese, and is largely used by them as a tonic and for supposed nutritive qualities. In 1892 the United States alone imported one hundred million pounds of licorice, and the quantity is steadily increasing.

Philadelphia, Pa.

B.

The Bladder Nuts.

To the Editor of GARDEN AND FOREST:

Sir,—I am surprised that the European *Staphylea pinnata* is not more often found in our shrubberies. It is a good deal better than *S. trifolia*, the native Bladder Nut of our eastern states with clusters of white bell-shaped flowers. *S. pinnata* has bolder leaves, larger flowers, which are pure white and fragrant. *S. Bumalda*, from Japan, is also very interesting, and *S. Colchica*, whose flowers have the fragrance of Orange blossoms, is the most beautiful of all, a compact little shrub, which is said to be good for forcing. All these plants are interesting, even after the flowers are gone, with their inflated pods which give them the common name. Few shrubs have given me more pleasure than the various species of this genus.

Shepherdstown, W. Va.

Danske Dandridge.

Periodical Literature.

A recent article in the *Pall Mall Gazette* gives an interesting account of the culture and brief harvest of those strange little "immortal" flowers so closely associated with mortality on the Continent and in London also, though the fashion for them in England is of a more recent date. Naturally they are a valuable crop, and, strangely enough, a somewhat difficult one to handle, as they will not grow everywhere. The world's supply of them comes from the neighborhood of a little burg, Ollioules, in the Var, near Toulon, half a dozen miles out on the main road to Marseilles, in the south of France. There, on the edge of a straight and narrow pass, bordered with piled up, cleft and calcined rocks, on the arid soil that suits it best, grows the "Immortelle," that curious *Amaranth*, *Helichrysum orientale*. The plants are low, flat and rosette-like, appressed on the ground, each one sending up two or three slender stalks, which about the first week in June are covered with small Primrose-buds. Each stalk carries some twenty or thirty buds, and the right moment for their gathering must be carefully watched for by the harvester, as too early is as disastrous as too late, since the flower then perishes in drying. After the drying process, an easy

one in the sun-baked valley, comes the dyeing, when the "immortelle" takes on its conventional ruddy color. Many of them are also dyed black for the purpose of picking out the legend or dedication on cross or wreath. They are then bunched and boxed for transportation to Paris or London, as the case may be. The crosses and wreaths are largely made up on the spot, the feminine fingers at Ollioules being passing deft at this unique and intricate industry. Every bud has to be sewed into its place on the framework of plaited straw, which is the backbone of the design and which must not show when the article is ready for the market.

"Immortelle" prices vary at Ollioules; last year, for instance, they sold for £3 per hundredweight, and a good year brings in £8,000 to the small community.

Recent Publications.

The Spruce Forests of Maine.—II.

Third Annual Report of the Forest Commissioner of the State of Maine, 1896. Augusta: Burleigh & Flint.

This rapidly diminishing supply of standing timber makes the question of the future growth of the trees which remain and the reproduction of new ones one of vital moment, and Mr. Cary gives much space and many valuable data to its discussion. He ascertains the rate of growth that is to be expected of the trees which the lumberman has left, and argues the question whether and to what extent more economical cutting pays. At present the practice, varying in different parts according to the facilities of bringing material to market, is to cut down to eight-inch diameter, breast-high, although occasionally larger trees are left uncut, being either overlooked or inconvenient to get out. The amount of wood left to the acre of measurable volume of Spruce Mr. Cary sets down as in general varying from 300 to 500 cubic feet, according to the closer or more liberal practice of the logger. On these left-over trees Mr. Cary determines the annual growth in volume a year at from two to three per cent. compound interest. The method employed to arrive at such result, namely, by the use of Pressler's accretion borer, is, to be sure, of questionable value for the purpose for which Mr. Cary uses it, although excellent under very different conditions; nevertheless, for a general statement, where accuracy is not of importance, we may accept the results as sufficiently close. If we take the largest figure of tree volume remaining, namely 500 cubic feet, at two per cent., the annual growth is ten cubic feet "which," Mr. Cary says, "at a fair equivalent might be called forty board feet." Eventually such a translation into board feet may become permissible, but it is hardly so for the first ten to twenty years, considering that we have to deal with only small-sized timber. Nevertheless, if we allow this figure to prevail over the entire area in question, and assume that the uncut portions participate in the same proportion of increase, the 2,800 square miles involved would add annually a round seventy million feet, board measure.

Mr. Cary, himself, guesses—for there is after all but little more than a guess possible from the meagre data—that the Kennebec area produces fifty-three million feet new growth annually. Applying the same ratio to the much harder cut, and hence, in regard to annual growth, much less favorably situated Androscoggin district, we arrive at the same total, namely, seventy million feet of new growth on these two areas. That is to say, after the sixteen years, for which the virgin supplies are estimated to last, there would have accumulated in new growth at best not enough to supply four years of the present annual cut. Mr. Cary abstains from applying his figures or drawing conclusions in this way; on the contrary, he speaks with a sanguine air of "the bounty of nature in setting at our hand greater supplies, when all are considered, than we are yet able to utilize," and thinks that "to talk of European economy for the state of Maine is folly."

Many other notes of interest are to be found in the vol-

ume, which the interested reader will find hidden away in the recesses of this woodman's tale, of which we can mention only a few. Here is, for instance, a most valuable observation to be heeded by the forest exploiter, namely, that where Spruce forms the prominent feature of the virgin growth, the culling process of the lumberman prepares a large loss in the shape of windfalls; older trees left, having lost the support of their neighbors, are uprooted and thrown. This loss Mr. Cary estimates as often more than half the timber left. Thus he states the account of a sample acre as follows:

Left standing by the logger, -	850	cubic feet.
Blown down in 17 years, -	500	" "
Remainder, - - -	350	" "
Growth on it during 17 years, -	150	" "
Now standing, - - -	500	" "
Balance lost, - - -	350	" "

The loss is really much greater, almost double; for we are entitled to the accretion on the entire amount left standing, hence adding to the 850 cubic feet, which the logger left, at the assumed rate of increase ($2\frac{1}{2}$ per cent.) for seventeen years, that is, 340 cubic feet, and deducting the amount now standing, namely, 500 feet, we find that 690 feet at least were lost during the time in original growth and accretion.

The account with another acre is calculated as follows:

Original stand, 52 trees of 12-inch and over, -	1,360	cubic feet.
214 " of 3-12 inch, - - -	1,440	" "
266 " - - -	2,800	" "
Utilized 36 per cent. in logs hauled, - - -	1,020	" "
Wasted 47 per cent. { in stumps and tops, -	340	" "
{ destroyed in cutting, -	480	" "
{ blown down, - - -	480	" "
Left to grow, 17 per cent., - - - - -	480	" "
	2,800	" "

Mr. Cary advises, therefore, to cut down to the lowest available diameter wherever Spruce stands thickly, in order to reduce the inevitable loss by windfall, while in mixed growths in which hardwoods predominate, and hence the timber left is supported by neighbors, the cut may be more conservative without danger of windfall.

He then attempts, with admittedly insufficient data, to discuss the financial difference of a severe and a conservative cut. The results can hardly be more than illustrative of what natural reasoning leads to, namely, that the severer the cut the less is left to grow and the longer the time, when the logger may come again on his robbing expedition.

In this part of the discussion Mr. Cary makes what, from the forestry point of view, we must consider a vital omission when he leaves the question of reproduction entirely undiscussed. This is like a stockman who sees in his swine, young and old, nothing but animals to be fattened and slaughtered as soon as they are fit to kill, but provides for no new litters to replenish the herd and keep up the supply. The young growth left is to grow on to log size and then to be cut—that is to say, the robbing system is simply to be continued as long as there is something to rob. It would have been proper for Mr. Cary to point out that under the present system, while the hardwoods remain occupants of the ground, with the Spruce constantly diminishing in number, not only will the rate of growth on the smaller sizes be constantly diminished by reason of the shade of the overgrowing hardwoods, but it is only a question of time, and not a very long time, when the Spruce will be practically eradicated, at least in all mixed growths. He fails to point out to the lumbermen, for whose benefit he attempts to find the best method of management, that this system of culling out the Spruce must inevitably result in killing out all Spruce growth.

With all its shortcomings and its faults from a literary point of view, which seem due to the pardonably exuberant enthusiasm of a man who has found a new and promising field of work, the study of this report cannot but be helpful to all who are interested in practical forestry prob-

lems. The author states modestly enough that when he took the field he had "very indefinite ideas" as to the object to be attained, and began "with partially unformed purposes." This may account largely for the lack of form in the results. The author is a thorough woodman and good observer, and his contributions to practical forestry will, no doubt, gain in value with experience.

Washington, D. C.

B. E. Fernow.

Notes.

The degree of Master of Arts has been conferred by Harvard University upon Mr. C. E. Faxon for his attainments in science and art. The readers of GARDEN AND FOREST know something of the substantial quality of his botanical knowledge and of his skill as a botanical draughtsman.

A very striking display was made at Floral Park during the last week in June when four acres of Japanese Irises were in flower. Nearly one acre is devoted to a pure white sort named Gold Bound, while the dark purple kinds are best represented by the variety Mahogany. The pale mauve of Exquisite and the bright blue of Blue Jay indicate some of the colors through which these flowers range. Individual flowers are said to measure nearly ten inches in diameter and single plants carry from twenty to twenty-five spikes.

A correspondent of *The Gardeners' Chronicle* writes from Manila of a remarkable *Dendrobium*, a new species which has been named *Victoriæ reginæ*, in commemoration of the Queen's jubilee. The plant grows at an altitude of 6,000 feet and higher, and the branching stems produce great numbers of richly dark blue and white blossoms borne in trusses and lasting for several weeks. The flowers are more than an inch in diameter, the petals at the base being white, with a large blue blotch at the edges, the lip ovate, oblong and of the same color. It is, without doubt, one of the most striking of the *Dendrobiums*.

Professor Bailey and Mr. Wilhelm Miller have issued another bulletin on the *Chrysanthemum* which contains much that is of interest to florists and flower lovers generally. Mr. Miller's chapter entitled "*Chrysanthemums at Home*" is certainly worth publishing under the Nixon Act, and perhaps the horticultural knowledge which can be disseminated by investigations and publications of this character justify the use of the costly machinery of the experiment station in this particular direction. The question is whether it could not be used to better advantage elsewhere. But since the bulletin is published primarily for educational purposes, we must express our regret at the use of such a barbarism as "mum" for *Chrysanthemum*. A subject which is of sufficient importance to be discussed in a bulletin from a university ought to command the use of dignified and scholarly language.

What is said to be the largest sale of Mediterranean fruit ever made in this country took place in this city on Monday of last week, when the cargoes of three steamers were disposed of. Almost 45,000 packages of oranges and lemons were bid off in the auction, which lasted five and three-quarter hours. The sales aggregated almost \$75,000, or \$200 for each minute of that time. When it is considered that the report of an expected cold wave influenced the demand for lemons unfavorably, and that the sales were in as small lots as five boxes and upward, the sustained energy of the auctioneer and the general business dispatch are better realized. A cargo of the same fruits was disposed of on each succeeding day of last week, and the week's sales amounted to 30,300 boxes of Sorrento, Palermo, Messina, Rodi and Catania oranges and 122,050 boxes of Messina, Palermo, Maiori and Sorrento lemons.

The United States Department of Agriculture has just issued the first number of a new series of brief popular bulletins based upon the work of the experiment stations for the purpose of setting forth the practical side of certain features in the progress of agricultural investigation. An introductory note states that this work must not be depended upon to lay down any "rules for farming," and that the results reported are generally regarded as tentative and suggestive rather than conclusive, leaving to the individual farmer the problem of applying the results of experiments to his own peculiar conditions. This bulletin of thirty pages treats of a dozen topics, and every paragraph is full of instruction. A chapter of three pages devoted to the subject of barnyard-manure is exceptionally good in its treatment of a subject of prime practical importance and one that has been the study of the most eminent agricultural chemists ever since agricultural chemistry has

been a science. How to manage and preserve this product in an economical way without losing any of its fertilizing value is a problem in which every cultivator of the soil is vitally interested, and in these few paragraphs some of the results of the latest researches of the leading experimenters in the country are explained in clear and simple language.

The Rural New Yorker regrets that *Magnolia hypoleuca* is still a rare tree in the United States, and, indeed, it is remarkable that so beautiful a tree remains comparatively unknown, although it was sent to the United States thirty-two years ago from Japan by Thomas Hogg. We published a figure of it in the first volume of GARDEN AND FOREST, taken from a tree which was planted with many other rare Japanese plants at the foot of Eighty-fourth Street, in this city, in 1865, where it may still be standing, although an alteration in the grade of the street has left it bruised and hidden behind a bank of earth. The foliage is light bright green above and pale steel-blue or almost silvery beneath, and its large flowers exhale an odor which by some is thought to resemble that of a pineapple, while others describe it as a combination of the wintergreen and the fruit of the banana. They have cream-white petals and scarlet filaments, and are six or seven inches across when fully expanded. In this city these flowers appear early in June, after the tree is in full leaf. It is a common forest-tree in the northern island of Japan, where it attains a height of a hundred feet or more with a trunk diameter of nearly two feet.

Bartlett, Lawson, Beurre Gifford, Comet, Wilder and Lawrence pears were among the fruits in sixty-one car-loads received here from California last week, with Alexander apples, and peaches, plums, prunes and cherries in extended variety. It is interesting to note the trade in dried fruits so late in the season, and evaporated apples, raspberries, huckleberries, blackberries, cherries, apricots, peaches and plums of last year's crop are sold in the home markets and exported in considerable quantities. The highest grade of evaporated apples are still in demand for shipment abroad, and nearly 1,700 boxes of dried fruits and raisins left this port for Liverpool alone last week, while 850 packages of dried California fruits were shipped to Hamburg. So late as June 19th the weekly output of dried prunes from San José, California, amounted to above 45,000 pounds. Other exports of fruits and vegetables which suggest the complex demands of trade are 900 crates of bananas shipped to England during the past fortnight, and 245 barrels of winter apples. Several thousand barrels of American potatoes leave this port for Cuba each week at this season, and the first consignment for this year of fresh California fruits, consisting of five car-loads, was started from that state for London on June 29th and is due in England about July 13th.

A bulletin just issued by the Agricultural Experiment Station at Alabama gives an account of some hybrids between American and foreign Cotton-plants which were tested last year. Seeds of foreign varieties which had been acclimated by planting in the United States, from different parts of India and from Egypt, were crossed both with the Long Staple and Short Staple varieties grown in the United States. Sea Island Cotton, which belongs to the species *Gossypium maritimum*, sells for twelve cents a pound, but the demand is greater than the supply, and therefore the Long Staple Cottons of Egypt find ready market here. Fifty thousand bales of this cotton were sold in the United States in 1896, and buyers were glad to pay eleven cents a pound for it. Without giving in detail the results of hybridization, it may be said that many of the Indian Cottons, as, for example, those derived from *G. hirsutum*, did not blend with certain American kinds, but some of the Egyptian forms which are varieties of *G. maritimum*, to which our Sea Island Cotton is referred, combine well with this type. Mr. Mell, the experimenter, concludes that the hybrids between the Egyptian and American kinds are generally equal to the parents in good qualities, and the Egyptian kinds make better fibre in length of strand, in strength and texture, than the Indian kinds. The Sea Island Cotton in combination with two of the Egyptian varieties produces a superior grade of staple, and the plant is rather prolific, so that there seems to be a prospect of securing a variety which will be a healthy, long-staple, upland cotton. A blending of small-bolled species with large-bolled species is not advised, since the resulting cross is generally weak, but when plants referred to *G. maritimum*, which is slow in maturing its bolls, so that frost often catches them before they are open, are united with a suitable strain of *G. hirsutum*, the hybrid reaches maturity quicker and is more prolific, and the combination of these species yields a plant which produces fibre of the best grade in strength, maturity, twist, length, fineness and yield to the acre.

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One Way to Reduce the Cost of Park Maintenance.

THERE are few public parks in this country in which the trained eye does not generally detect a disheveled or untidy look. The shrubberies are disfigured by dead wood; strong, coarse-growing bushes are smothering the more delicate ones; trees are defoliated by insects and fungi, and many of them are making a sickly growth; the road borders are ragged and the general effect is a weak imitation of untamed nature. The hand of man is visible everywhere, but his efforts are too feeble to be the controlling force, and they rather mar than make the landscape. If this fact is pointed out to park superintendents or park commissioners they at once reply that in the first place they cannot secure enough money to do the work as it is done in the most carefully managed private grounds, while, in the second place, if they had all the money the work demands it would be impossible to secure enough skilled labor and intelligent superintendence to do it in the most approved way. And there is much to justify this excuse—that is, parks do languish for lack of maintenance, and adequate maintenance is impracticable for lack of funds and trained workmen.

Under such conditions the parks must suffer, of course, but it is singular that some commissioner, instead of struggling after appropriations which, under the growing expenses of modern cities, are much harder to secure every year, does not argue in favor of designing and constructing parks in such a way that they can be cared for more cheaply. We are speaking now of large rural parks where quiet landscapes are the essential features. To provide such landscapes we need good grass, good trees, an abundance of hardy shrubs effectively arranged, with good roads and walks to make the pleasant prospects available. Little else is necessary, from an artistic point of view, for the more simple the material the more effective and enduring will be the picture which an artist of real creative faculty will produce. To insure cheap maintenance it is essential that all work should, in the first place, be done thoroughly and well. The roads should be perfectly drained and constructed of the best material, and there should not be too many of them. Equally or even more

important is it to have a deep, rich, well-drained soil, for turf on such a soil lasts longer and is more easily kept free from weeds, while the trees and shrubs planted in it will also be long-lived and their branches will not be dying back every year as they do on trees and shrubs which lead a starved life on thin, sterile soil. Of course, the hardiest trees and shrubs should be selected, for there is no economy in planting trees or shrubs which are liable to be killed every year or so, partially if not entirely, by frost or heat, or drought or winds, or some other freak of American weather which annually works ruin upon a large percentage of our exotic garden plants. Nor should we select plants like garden Roses, which, unless carefully watched, are disfigured every year by insects. It costs time and labor to cut out dead or dying branches, to remove dead trees and fight insects.

But the shrubs and trees which need the least attention are not only the most economical ones to plant; they are the best from an artistic point of view. The fact is, that for producing large effects, for making scenes which a painter would like to transfer to canvas, we do not need any great variety. With wood borders of our native American trees, a dozen good shrubs, half as many climbers and green turf, a good landscape-gardener can produce scenery which is more truly restful to nerves overstrained by city life than any more elaborate planting scheme could make. In fact, it is quite impossible to take all the showy trees and shrubs which are available in this climate and group them together so that they will have any consistency or unity of design. A landscape-painter would make himself ridiculous if he argued that his picture was valuable in proportion to the number of different colors which he could manage to work into his canvas, and certainly the landscape-gardener who tries to use all known shrubs and trees of diverse form and habit, and with flowers and leaves of every color, is more likely to create a landscape which resembles a crazy quilt than one which suggests a picture of peace. Some of the noblest pleasure-grounds in the world contain nothing but big trees and grass; and how superior simplicity of this sort is to the fussiness of modern decorative gardening will be appreciated by any one who compares St. James Park, in London, with Battersea, on the other side of the Thames.

The tendency among superintendents of planting in parks is constantly toward showy plants, and particularly exotic ones, and if they are rather rare so much the better. They seem to feel that the way to establish a reputation is to produce something that will excite surprise and which will strike the beholder as remarkable, and, no doubt, the shrubs and trees which can show the gayest flowers will be more likely to arrest popular attention, and therefore these plants are very largely selected. Now, a very elaborate and varied planting scheme may be admissible on private grounds of limited extent, although on a large place a true artist will exercise restraint in this particular. But when a man can afford to plant a collection of rarities he can probably afford to maintain them. If any of them are unable to take care of themselves he pays for the labor and other expenses which are required to give them special protection. He sprays them against attacks of fungous diseases and defends them against the assaults of destructive insects; when they die back in winter, his gardeners cut the dead wood away and he gives them all the pruning and training that is necessary to keep them looking trim and happy. Public grounds, however, should be considered from an entirely different point of view. Shrubs with gaudy flowers are out of place where children, old or young, will be tempted to break off their branches. Shrubs and trees which need constant pruning to keep them from looking shabby should be rejected. Elaboration in planting ought to be forbidden as utterly as needless construction. The very qualities which would make a particular shrub or tree tempting to a man who is searching for a showy specimen to decorate the border of his small lawn are the very ones which ought to condemn it for use

in a park where the general effect is the first thing aimed at and where economy in maintenance is a necessity.

The sum of the matter is that one good way to reduce the cost of maintaining rural parks is to make them less pretentious and artificial in design and to construct them in the outset in the most thorough manner. This will not only save money, but it will lessen the danger of sins against good taste. At least, it will tend to encourage that simplicity which is the foundation quality of all sincere art.

Second-growth White Pine in Pennsylvania.

THE valley along Hickory Creek and its tributaries—Beaver, Otter and Queen Creeks—the slopes and the tops of the hills which surround it, extending to the banks of Tionesta Creek, are in places abundantly covered with thrifty young White Pines. The second-growth White Pine here is of particular value; it affords an opportunity to study the process of natural regeneration of White Pine and its progressive development under conditions almost like those which would generally take place in the pineries, should the cuttings be regulated so as to assure the complete reproduction of the Pine. While the White Pine in Pennsylvania reproduces itself readily everywhere—in the openings of the forest, on the cut-over lands and on the abandoned fields—still the areas of second-growth White Pine are usually small, and the park-like aspect of the young growth does not allow us to draw conclusions as to what an area completely restocked would look like, and as to what the progressive development of a second-growth White Pine would be under forest conditions. The unsatisfactory state of reproduction of White Pine is due mainly to the lack of a sufficient quantity of good seeds. The only seeding trees to be found on the cut-over lands are the few defective Pines left, which provide undesirable seeds with a very low percentage of germination. Then also the inferior hardwoods, always spared by the axe, cover the ground with a thick young growth which hinders considerably the germination and development of the few Pine seeds accidentally brought by wind. The successful and complete regeneration of the Pine at Hickory Valley finds its explanation in the fact that the areas now grown up with young Pine, when stripped over forty years ago of their original growth, were surrounded by forest, and thus abundantly provided with seeds from the adjoining walls of standing White Pine.

An acre representing typical conditions of regeneration in the valley was staked off on a steep slope facing the south-west. The young Pine on the acre was mixed with hardwoods and scattering Hemlock. The dense undergrowth consisted of 160 Beech-trees, 108 Maples, 12 Oaks, 9 Ashes, 76 Black Birches, 189 Yellow Birches, 100 Ironwoods, 2 Black Cherry trees, 2 Hickories and 248 Hemlocks, all of which were very small, less than three inches in diameter and from five to ten feet high. The soil, being here uniform, was a clayey loam intermixed with shale, yellowish brown in color, deep, fresh, drained on the south by Beaver and on the west by Hickory Creek, with three or four inches of mold on top and a surface cover of abundant leaves and a few Ferns. The subsoil was a laminated shale of an indefinite depth. The age of the Pines ranged from forty-two to forty-eight years. The canopy formed by the Pine in places represented a full cover, but the average density of crown cover on the acre was 0.8. Of the 753 trees on the acre there were 383 White Pines, 50 Beeches, 46 Maples, 20 Oaks, 16 Ashes, 73 Black Birches, 59 Yellow Birches, 13 Ironwoods, 15 Black Cherries and a few Aspens and Butternuts not counted.

The following are the dimensions of the White Pine: One tree was fifteen inches in diameter, breast-high; one, fourteen inches; one, thirteen inches; four were twelve inches; twelve, eleven inches; twenty-one, ten inches; twenty-eight, nine inches; twenty-four, eight inches; twenty-three, seven inches; thirty-four, six inches; forty-nine, five

inches; forty-one, four inches; fifty-six, three inches, and eighty-eight were under three inches in diameter. The number of Pines over three inches in diameter is thus 295, while only 149 were more than six inches in diameter.

The dimensions of the species intermixed are as follows: Seven Hemlocks, at breast-high, ranged from six inches to twenty-four inches in diameter, and seventy-one from three to six inches. Two Beeches ranged from six to fourteen inches, and forty-eight from three to six inches. Two Maples ranged from six to ten inches, and forty-four from three to six inches. Seven Oaks ranged from six to ten inches, and thirteen from three to six inches. Four Ashes ranged from six to ten inches, and twelve from three to six inches. Seventy-three Black Birches ranged from three to six inches; two Yellow Birches from six to ten inches, and fifty-seven from three to six inches. One Ironwood ranged from ten to fourteen inches, and twelve from three to six inches. Five Black Cherries ranged from six to ten inches, and ten from three to six inches.

From these measurements it is seen that while the number of White Pines over three inches in diameter constitutes only forty-four per cent. of the total number of trees on the acre, the number of White Pines over six inches in diameter, when compared with that of all the other species on the acre above that dimension, swells to the dominating per cent. of eighty-three. It is not astonishing, then, that the reproduced areas at Hickory Valley carry with them an impression of being stocked exclusively with White Pines. The close examination of the above tables throws a good deal of light upon the nature and process of regeneration of White Pine. The total number of trees on the acre, including the undergrowth, is 1,723; the number of White Pines is only 383. The Pines then have started and grown among the hardwoods, which, being large in number, did not, however, interfere either with the reproductive power or the thriftiness of the Pines. The hardwoods were gradually crowded out, and in the long and natural struggle for light and room succeeded only so far as to retain twenty-three individuals of considerable size, leaving all the others, together with the Hemlock, far below the canopy formed by vigorous Pines. This clearly shows that, with the provision of a sufficient quantity of Pine-seeds, the hardwoods need not interfere with the successful reproduction of White Pine, unless it be old and dense timber, which shades the ground and young growth unduly. On the contrary, the hardwoods, instead of being undesirable weeds, may render to the success of regeneration of White Pine manifold and valuable services. First of all, the hardwoods on the ground prevent it from growing up into weeds, which are far more dangerous to the starting Pines than the hardwoods. In the seedling stage the Pines are protected by the hardwoods from frost, which, when occurring at the beginning either of spring or fall, is liable to kill the terminal branches of the Pines. When the Pines reach a similar height with the hardwoods, the latter become stimulants for the height-growth of the Pines. When the Pines have lifted their boles above those of the hardwoods, the latter assume the rôle of undergrowth, protecting on one hand the ground from the direct rays of the sun, and on the other providing ample shade for the shafts of the Pines, and thus clearing them of limbs. The accumulating leaves of the hardwoods shed annually form a rich litter, a natural forest-manure, which improves the physical conditions of the soil, thus indirectly benefiting the growth of the Pines. Then the larger number of trees to the acre usually found in mixed forests affords ample protection from wind. Adding to all this, that the spread of diseases caused either by fungi or insects is naturally prevented in mixed forests, the value of the hardwoods with regard to the regeneration of White Pine and its development may be better understood.

The thrifty appearance of the White Pines at the valley, the straightness and clearness of their shafts and the proportionally developed crowns prove that the Pines here

were considerably benefited in their growth by the presence of the hardwoods.

For the information of the Division of Forestry twenty-seven individual Pines from this locality were measured and completely analyzed. The table given below illustrates the progressive development of the dominant young White Pines at Hickory valley:

TABLE SHOWING THE RATE OF GROWTH OF DOMINANT YOUNG WHITE PINES AT HICKORY VALLEY, PENNSYLVANIA.

Age.	Diameter, breast-high, without bark.	Height of tree.	Volume without bark.	Periodical accretion.				Average annual accretion.	Current annual accretion.
				Decade.	Height.	Diameter.	Volume.		
	Inches.	Feet.	Cu. ft.		Feet.	Inches.	Cu. ft.	Cu. ft.	Cu. ft.
10	3.4	9	0.3	1	9	3.4	0.3	0.03	0.03
20	7.2	26	3.3	2	17	3.8	3.0	0.16	0.30
30	9.5	42	9.2	3	16	2.3	5.9	0.31	0.59
40	12.2	54	19.7	4	12	2.7	10.5	0.49	1.05

The height of the Pines on the sample acre was from fifty-five to sixty-five feet, with a volume of stems varying from sixteen to thirty cubic feet. The yield of the acre for the Pine only, not considering the 144 Pines under four inches in diameter, was 1,824 cubic feet, which means an average annual accretion of forty cubic feet. The current annual accretion during the last ten years was 110 feet. It will certainly increase up to eighty years, but assuming that, contrary to biological laws, the current accretion will remain the same up to one hundred years, the yield of the acre for that age will be at least 8,000 cubic feet. Making an allowance of fifty per cent. or sixty per cent. of waste when passing through the mill, the 8,000 cubic feet will furnish from forty to fifty thousand feet, board measure. A sum of from \$200 to \$250 net could then be realized after the lapse of fifty-five years.* A calculation with four per cent. compound interest establishes the present value of the acre at from \$23.00 to \$29.00 when kept under forest growth. For agricultural purposes it is not worth anything, because the steep slopes of the hills from 400 to 500 feet above any roadway are absolutely unfit for cultivation.

Washington, D. C.

A. K. Miodziansky.

Roots in Commerce.—II.

THE Butterfly-weed, *Asclepias tuberosa*, of our roadsides and dry pastures, with its well-known deep orange-colored flowers, is represented in trade by its root, which is known as Pleurisy-root. Growing throughout the United States, this plant is particularly abundant in the south, where the fleshy, irregular, often spindle-shaped roots are esteemed as a remedy for flatulence and indigestion as well as for pleurisy and affection of the lungs. This Milkweed differs from other species of *Asclepias* in not giving out a milky juice when cut or bruised. Another root of the Milkweed family in commerce is Indian Hemp, *Apocynum cannabinum*, used as an emetic and cathartic. The small shrub *Spiræa Ulmaria* affords the root which appears in the lists as Queen of the Meadow, and is known also as Meadow-sweet or Meadowwort. This part of the plant is considered less valuable, however, than the leaves and bark. Pellitory, the root of the composite plant, *Anacylus Pyrethrum*, brought from the Mediterranean regions of Africa and Europe, is especially useful in dentistry as a powerful irritant and sialogogue. At one time Arrowroot, *Maranta arundinacea*, was successfully grown in Georgia and Florida, but the supplies for this country now come almost entirely from Bermuda by way of England, and from St. Vincent, one of the British West India islands. It is also cultivated in other of the West Indies, and in the East Indies and Africa. Arrowroot from the Bermudas has the highest reputation, and its cultivation and manufacture are carried on in primitive fashion by the

small farmers in St. David's and other remote islands of the group. This nutritious starch, which is now used almost entirely as a delicate food for sick persons, is said to owe its name to Indians, who used it for neutralizing the venom from poisoned arrows.

Marshmallow-root, *Althea officinalis*, is at home in the temperate parts of northern and western Asia and the greater part of Europe, and has been naturalized in the salt marshes along the coast of New England and New York. The roots are collected in spring or autumn when two or three years old, the outer skin being removed in their preparation for market. They are sometimes used to give proper consistence to pills, as a demulcent and a poultice, and are credited with nutritious qualities. The blackish knotted rhizomes of *Helleborus niger*, with their many long brownish fibres, come from the mountains of southern Europe. The plant has an assured place in gardens for the late flowers known as Christmas roses. The ancients ascribed great power to Hellebore and used it for relief from such desperate diseases as epilepsy, some forms of mania, dropsy and scrofula, while its use is now comparatively restricted.

One of the most important exports from Mexico is jalap, the tubers of *Ipomœa purga*, and it also comes from Brazil. It consists of resin and starch almost entirely.

The rhizomes of Male Fern-root, *Aspidium Felix-mas*, and our native *A. marginale* are gathered in summer before they are a year old, since they soon lose their anthelmintic properties. Like many modern remedies this was also a medicine of the ancients and is mentioned by Pliny as a vermifuge.

Sarsaparilla may be the root of any one of several tropical American species of *Smilax*, principally *Smilax officinalis* and *S. medica*, and of *Aralia nudicaulis*, the wild Sarsaparilla of this country. These bitter mucilaginous roots are used in medicines and in syrups for flavoring. The Sarsaparilla from Honduras is most highly esteemed, and the Spaniards introduced the roots to Europe from Peru, Brazil and San Domingo as early as the middle of the sixteenth century, when they were supposed to be potent in serious blood diseases.

Perhaps 250 tons of dried Rhubarb-roots, *Rheum officinale*, are used in this country each year, most of the product coming from Shanghai. Pieces of the rhizomes, which are heavy and close, brittle and of lively color, are the best. As a medicine it combines the opposite qualities of a cathartic and astringent, and is also a tonic and stomachic, and helps digestion. A root which finds sale as a remedy for colic, but which is not considered official by the medical profession, is Masterwort, or Angelica (*Angelica atropurpurea*). The perennial purplish root is common in Canada, and in the United States as far south as the Carolinas, in marshy woodlands and meadows. Another once popular remedy, now but little used, is Mugwort, *Artemisia vulgaris*, formerly a favorite German remedy for epilepsy.

Pareira brava, the root of *Cissampelos Pareira*, a climbing woody vine known as the Velvet Leaf, comes from South America. In Brazil it is used to offset the bites of poisonous serpents. It was introduced into European practice as long ago as 1688.

Years ago the Creeks and Cherokees in Georgia and the neighboring country collected Pink-root in their uncertain intervals of industry, and the plant was abundant in all the states south of the Potomac. The supply in time became smaller and fell short of the demand, but the western and south-western states now provide all that is needed, and casks and bales of it are forwarded from St. Louis by way of New Orleans. The rhizomes and rootlets of Pink-root, *Spigelia Marilandica*, are a powerful anthelmintic, and in South America and the West Indies *S. anthelmia* is likewise used. Overdoses are poisonous.

Zedoary is the trade name of the rhizomes of different species of *Curcuma*, especially of *C. zedoaria*. The outside of the short wrinkled pieces are gray, the inside being brownish red. It comes from the East Indies and is used

* To be sure, the future generation will be glad to pay \$3.00 per thousand feet, board measure, for Pine stumpage, if there is any left fifty-five years hence.

as a stimulant. The fibrous yellow roots of Gold Thread, *Coptis trifolia*, while not regarded as having medicinal qualities, are, nevertheless, sold in large quantities for their bitter tonic properties. The small evergreen plant is familiar near springs and in marshy places, and will be recalled by many as a local remedy of the country housewife for sore mouth in infants. It is offered in loosely matted masses of the long, thread-like, orange-colored roots, mixed with the leaves and stems.

Quantities of the odorous root of *Valeriana officinalis* are gathered by the Shakers of New Hampshire, and the industry extends to northern Vermont and New York. But the demand for this one-time fashionable nerve remedy is much too heavy for our home supplies, and many hundred-weights come yearly from the gardens of Belgium and the Netherlands—perhaps four-fifths of the entire supply—with smaller quantities from Germany and England. *Valerian* also comes from Japan, and the root from that country is said to be the richest in oil.

The root of our Blazing Star, *Liatris spicata*, and of *Aletris farinosa*, often seen in sandy woodlands, and both commonly known as Colic-root, are bought and sold under the name of Unicorn-root. The woody root of the perennial American plant, *Stillingia sylvatica*, Queen's Delight, is sometimes used in combination with sarsaparilla and other alteratives. From the Peruvian shrub *Krameria triandra* the blackish red, long-spreading root known as Rhatany is supplied to commerce. The bark of Sassafras-roots and the pith of the twigs, gathered after frost in autumn, have a recognized place in pharmacy in the United States, and the entire root is exported to England, where, as in this country, large quantities are used in making summer drinks. Parsley-root has an assured place in the wholesale drug trade, as have the roots of the dwarf Nettle, *Urtica dioica* and *U. urens*, of America and Europe, and the Musk-plant, the Pond-lily and yellow Dock.

While, perhaps, all the roots regularly quoted in the wholesale druggists' price-lists have now been briefly referred to, these are but a few of the many in regular use in medicine. For example, the rhizomes of *Cypripedium pubescens* may be bought by the hundredweight, and those of *C. spectabile*, *C. acaule* and *C. parviflorum* all have a market value, some of them furnishing a gentle nerve stimulant less powerful than Valerian. Horse-radish, though not named in the trade price-lists, is used for internal and external remedies. But the list of roots in general use might be extended indefinitely, even without mention of the living roots from which juices are obtained by incision, as the gum resin *Asafoetida* from the root of *Ferula foetida*, and Scammony from *Convolvulus Scammonia*, besides the roots of our commonly used vegetables and of those of native plants which have only been partially tested.

New York.

M. B. C.

The Cañon Winds in Utah.

THE country adjacent to the mouths of any of the mountain cañons of this state is subject to what is known here as the "cañon wind," a strong breeze which begins about nine or ten o'clock in the evening and continues till about eight o'clock the following morning. These winds occur almost every night from early spring until late autumn, and are felt over a considerable area of country about the cañon's mouth, being strongest, of course, near this point, and gradually decreasing in velocity as they spread over the surrounding country.

They exercise an important influence over the fruit industry of the state, their effect being decidedly beneficial in some ways and equally detrimental in others. Their most marked beneficial effect is in preventing late frosts, and in this way they often save the fruit crop from destruction. A prominent fruit raiser of Provo, whose farm is situated just at the mouth of Provo Cañon, states that he is successful almost every year with apricots, peaches and the early-flowering varieties of grapes, while one of his

neighbors, just around a spur of the mountain and not more than a mile or two away, but out of the range of the cañon wind, often lost his entire crop of fruit by the frosts.

The detrimental influence of the winds is confined principally to producing ill-shaped, one-sided fruit-trees, the branches leaning away from the cañon to a marked degree. This effect is much more noticeable in some kinds of trees than others. Apples and Plums seem to be most seriously affected, while Pears and Cherries are much less so. There is also a marked difference in the effect on different varieties of the same fruit, some sorts of Pears showing almost no evil effect whatever, while others, standing near by them, will be seriously distorted. I am of the opinion that this difficulty might be obviated to a considerable extent by judicious pruning from the time the tree is set; at least so far as the general shape of the tree is concerned. The smaller twigs on older trees might be less easily controlled. In cases where a dense and sufficiently high wind-break can be grown on the cañon side of the orchard the evil effect of the winds is much lessened, while the beneficial effects with regard to frosts remain the same.

Shade-trees are affected in the same way as fruit-trees, with the same difference in different species. Contrary to what might be expected, the tall, spire-like Lombardy Poplars show but little ill effect from the winds, but Box Elders, Elms, and even the Carolina Poplars, wherever exposed, are blown entirely out of their usual form and lean away from the cañon, as if to get as far from it as possible. This same difference is noticeable in Pears, the upright-growing sorts being the least affected. Small fruits are comparatively free from the evil effect of the wind, though occasionally it is severe enough to injure even these, if exposed, especially when the shoots are young and tender or at blossoming time.

Utah Agricultural Experiment Station.

F. C. Sears.

The Care of Weak Limbs of Trees.

IN addition to misdirected efforts or mistakes in the pruning of trees, the results of errors in attempts to save broken or strengthen and support weak, but otherwise green and healthy limbs, are too often seen where trees are cared for. In many cases when a large branch or limb or part of the trunk breaks down to the ground, but still retains some connection with the main trunk, it is best, and will in the end prove most satisfactory, to cut off the broken portion and cover the wound with some one of the well-known substances to prevent the ingress of water, fungi, insects, etc.; or it may even be best to cut down the damaged tree and replace it by a new one. But in very many instances a little trouble and care would result in saving damaged trees for many years.

In supporting cracked, "wind-shaken," weak or overladen limbs, especially of Apple and other fruit trees, which have a tendency to split at the forks or crotches, poles are very often used as props, but this plan is hardly practicable in the case of large shade-trees, and, moreover, it is unsightly.

Limbs of trees liable to split in the forks or crotches are very often held together by placing an iron band or chain around two parts nearly opposite, so that they afford mutual support, and while this may seem to serve its purpose for a time, the increase in circumference and diameter of the limbs soon causes real injury by a process of choking or strangulation which ensues. Through their very small root-hairs and rootlets trees take up from the ground water and some other materials in minute quantities and crude form. This is carried up through the sapwood to the leaves, where it undergoes processes which prepare it for the making of new plant tissue. From the leaves the elaborated sap passes downward between the wood and bark of the stem, branches, branchlets, roots and rootlets, gradually forming new layers of wood and bark and increasing the diameter or circumference of all the parts. When the bark is unduly tightened by any strong band, wire, or even a strong string



Fig. 35.—The right and the wrong way to support a weak branch.—See page 274.

around it, the descending sap is obstructed and more wood will be formed on the upper side of the band than is formed below, and this increases year after year until the discrepancy may be very great. If the girdling is complete the part of the plant above the girdle is almost certain to die prematurely.

The accompanying illustration (see page 275) shows the effect of placing an iron band around two large limbs. Many years ago the band was tightened against the outer sides of the opposite branches, and now a considerable difference in diameter is seen in the portions above and below the girdle which encircles both limbs. The wood above has begun to grow down over the band of iron. Besides checking the proper growth and development of the plant, the trunk is structurally weakest at the girdled point.

Above the band and constricted portion appears in the illustration a simple iron rod running through the two limbs and treated as an ordinary bolt. In nearly all cases this is the simplest and by far the best system of supporting broken or weak limbs when they are opposite or nearly so. A rod of good iron from an inch to an inch and a half in diameter will bear an enormous strain, and is only necessary in the case of very large and heavy limbs, as of shade-trees. Of course, the strain is less, and a smaller bolt is required the higher up or farther away it is placed above the weak or broken fork or crotch of the limbs.

In a case as shown in the photograph, it is simply necessary to bore a hole straight through both limbs and bolt them together by inserting an iron rod of the proper length, having a large head at one end and a correspondingly large nut at the other, which should be screwed up tight. The rod should fit the hole as nearly as practicable, and a little wax, tar or paint may be applied around the iron where it enters the bark, so as to keep out moisture. After one season of growth any further care of this kind will be unnecessary, as the new tissue formed will have completely closed any opening around the iron. The hole bored does very little injury to the limb and soon heals permanently.

When the trees or branches are not too large or heavy, or when the rods are well up from the weak forks or crotches of the limbs, iron half an inch in diameter is amply strong enough. Where the rods are long and connect widely spread branches it is well to have them made in three separate pieces; two short bolts passing through the branches and a third connecting them, the inner ends of the bolts and the ends of the connecting third piece being provided with eyes or hooks. Made in this way there is no danger of the iron breaking by twisting caused by swaying of the upper branches, and such long rods are more easily fitted in place when in sections.

It is often worth while to preserve rare or valuable fruit or other trees which have split apart and fallen to the ground, but are still connected with the stump and are alive. By raising the limbs and connecting those opposite by several rods at various angles such trees may be preserved for many years.

Limbs of small trees and large shrubs which have become split apart may often be securely held together by simply screwing strong hooks into the opposing branches and connecting by strong wire.

The tree represented in the photograph is an American Linden, or Basswood, growing in a small front yard in the city of Boston.

Arnold Arboretum.

J. G. Jack.

Plant Notes.

CALOCHORTUS PLUMMERÆ.—This plant, otherwise known as *Calochortus Weedii purpurascens*, is, as Mr. Gerard has recently noted in these columns, a late-flowering species of the Butterfly Tulips. Its distinctness and quaint beauty deserve a special mention among July flowers. It grows vigorously although it has sparse foliage. Its large flowers are bowl-shaped, not reflexing on the margins,

as is common with most of the species. The coloring varies somewhat, but usually the upper halves of the petals are light lilac in color, and the lower parts greenish white. At the base also is a lilac marking like the arm of a Greek cross. The petals are of a satiny texture and lined nearly to the tips with profuse but short hair-like growths, which are sometimes purple and sometimes yellow. The sepals, which are wider than in most species, are lined with lilac and in some forms have dark blotches with hair-like growths. Some of the flowers sent to this office by Mr. Gerard are gracefully carried on long stems. They last well when cut and call forth the admiration of all who see them.

Cultural Department.

Transplanting Pæonies.

GARDENERS are well aware that the tops of *Lilium candidum* die down to the ground soon after the plants flower, when the bulbs take their rest, and in a few weeks begin to throw out roots and radical leaves which remain green all winter. The Oriental Poppy is another plant with large fleshy roots which behaves in the same manner, and, of course, the proper time to remove these plants is as soon as the tops have died and before the new roots have started for autumn growth. There are, however, many other herbaceous plants with fleshy roots the tops of which do not die down after flowering, while they send out a set of new roots in early autumn, which are probably useful in aiding to store up material in the root for the production of early flowers and seeds the ensuing year. Among plants of this class Pæonies may be mentioned, which are most successfully moved in this country in August. Owing to climate and exposure the most successful practice in English gardens differs much from that which prevails in this country, but the following advice from a late number of *The London Garden* is well worth considering in America:

An all-important item in the matter of Pæony culture is planting at the right time, and for this work no better time exists than the early autumn or late summer, by which I mean the end of August or during September. At this season of the year the plants will still be furnished with leaf and stem, and, preserving these intact, it is possible to lift and transplant a very large-sized clump of one of these Pæonies with the assurance that a good proportion of flowers will be forthcoming the year after. There are many who believe that planting or transplanting may be done at any time while the growth remains comparatively dormant, but let any such transplant a fair-sized specimen in September with all its foliage intact and another in January with no foliage and note the results. The one planted at the latter time will have many of its flowers blind in the ensuing year as a direct result of late planting. Nor is this all, since the same cause which has contributed to the blind buds will in all probability have produced a debilitated condition generally of the plant, though more particularly of its roots, that will not readily be overcome. A weakened root-action in a Pæony means a relatively weak growth, and from this an obviously weak bud at its base as the result. It may be thought that I have restricted the planting season to very narrow limits, yet I regard a certain season quite as important for these as I would for certain classes of bulbs to be planted before root-action commenced.

The whole subject of planting Pæonies turns on a question of roots, or rather the time and the manner these are produced, and when these facts are more generally realized the easier will it be to insure the planting of these within reasonable as well as seasonable limits. In Pæonies two sets of roots are produced in the year, the chief being in early autumn, and it is, therefore, to secure these intact that the planting should be done before they push forth. Planting done at a much later date either sacrifices these roots entirely or so mutilates them that they are of little value, and then the cry goes forth that Pæonies are difficult to establish. In point of fact, few things are more readily established when the work is done at the right time, but this is rarely the case. Lifted and planted when growth has well begun, and the plant has to exist all summer long on its own resources, it is little wonder the plants decline for a year or two or are slow to make a start at all. At Kew,

about two years since, some very large clumps were lifted, rearranged and replanted in full leaf in early autumn. Well planted, thoroughly soaked with water at the root, it was evident what the result would be the year after. Many of these plants, in fact, carried large, handsome blossoms, while to-day they are perfect examples and loaded with vigorous growths and flower-buds.

Next in importance to planting is the soil, which cannot be either too deep or too rich for these gross-feeding and vigorous perennials. Select a spot away from the roots of large trees and dig the soil as deeply as circumstances will permit, two feet, or three feet if possible. Work in quantities of well-rotted manure and bone-meal, old mortar rubbish and the like, also leaf-soil where this is plentiful and the natural soil very stiff or water-holding. So far as the soil is concerned, *Pæonies* will thrive in almost any that is deep and well enriched, but there must be no stint of manure, especially where hot sand or gravelly soils abound. In these latter it will be found a good plan to slightly sink the surface of the bed below the ordinary level, so that manure-water may be given freely at any time when needed.

Notes from Baden-Baden.

ALTHOUGH I regard Mr. W. Watson as a cultivator of the highest rank, yet my experience with *Richardias* constrains me to differ widely from his views. I treat these plants much like *Kniphofias* or *Gladioli*; late in autumn, when the foliage withers, the corms are taken up, left to dry in the greenhouse, and afterward they are stored away in dry soil in a cool room until spring, when at the end of March they can again be planted in an outside border. A still better, but less convenient plan is to leave the corms outside, to cover them with some five inches of dry leaves and put on a sash or boards to keep off the wet. My plants are sturdy, clean, superabounding in health and very free-flowering; they are now in flower and continue to bloom until the end of August. *Richardia Nelsoni* has slightly mottled, large, heart-shaped leaves and flowers of a very attractive creamy white, with a shade of sulphur and a large violet-black blotch. It is a striking plant and sure to find admirers. *R. Adlami* is another still more remarkable new species. It differs from the former by its glaucous green and more sagittate leaves, which have no spots, and by its somewhat larger flowers in which the violet-black blotch is larger, extending often to two-thirds of the spadix.

A lovely plant is *Dierama (Sparaxis) pulcherrima alba*, with white bell-shaped flowers hanging and swinging on minute threads. This plant must either be kept in a pot or must have the protection of a frame. The Caucasian alpine, *Campanula mirabilis*, is now covered with hundreds of its beautiful bright blue flowers, forming a low pyramid, which attracts the notice of every one who passes it.

Baden-Baden.

Max Leichtlin.

Garden Notes.

IN Mr. Gerard's interesting notes on June Irises I do not find *I. Tingitana* mentioned, to my mind one of the most beautiful Irises of the bulbous section. It grows about two feet high and bears a flower as large as that of the English Iris, so called, but shaped more like that of the Spanish varieties. Its colors are blue of two shades, white and yellow. I cannot speak as to its hardiness since I have always protected it with hay during winter.

I have spoken of *Ixias* before. Mine have just passed out of flower and have been so exceedingly beautiful that I feel it almost a duty to say again if they can have a covering about three inches thick until the first of April they will go through the winter perfectly well and be vastly more satisfactory than if grown under glass. There are only two or three points to be observed: Plant three inches deep, waiting until the end of November, so that there shall be no danger of premature growth; cover with three inches of Pine or other leaves or hay, removing the same about the first of April, so that the shoots shall come strong, and take up the bulbs about the end of July. I have now in flower two varieties of what Dammann & Co. call their *Victorialis* strain of *Gladiolus*. They are almost the same as *G. Byzantinas*, but not quite as good. They are said to have the blood of some of the African species, but I see no evidence of it.

Asphodelus ramosus seems to be desirable when grown to a good size. A plant of it this year reached a height of nearly six feet, branching freely, and was covered with its fine white blossoms almost two inches across, with a thin red line down

the centre of each division. It really seems to me as fine as *Eremurus robustus* and much more easily managed.

The best things under glass at present are *Gloriosas* and *Gloxinias*. The shining, tendril-tipped leaves and the curious spidery flowers of the former are specially attractive. I once succeeded well in growing *Gloriosas* out-of-doors. They climbed on pea-brush to the height of four feet and made quite an unusual effect. I never could get them to do it again and have not tried of late. The nearly allied *Littonia modesta* is much hardier, and I no longer give it room in the house, but treat it exactly as I do *Gladioli*. Planted in the open ground it has no tendency to climb. As for *Gloxinias*, I cannot think it well to dispense with naming varieties. It is true that the average seedlings of the present day are much superior to those of twenty years ago, but it is also true that many varieties then existing were superior in substance and coloring to those which are shown now. As soon as we cease to preserve the best kinds (and naming them helps in this matter) we shall cease to improve the quality of the flowers.

I have used a label of my own invention for several years which I can recommend as satisfactory in general practice. No one kind is best for all purposes, but where permanence is desired I write the name with India ink or a soft lead pencil on a bit of paper, inclose in a small bottle and cork it. The bottle may be fastened to a tree with a copper wire, or when used for *Dahlias* or *Gladioli* it can be fastened to a stake of wood or wire. I have used these bottle labels for four years, and not one has been broken, and some have been used for *Ixias* and have lain out on the ground, winter and summer, since 1893 without breakage or loss. I use a kind called half-ounce Boston round. A gross cost me \$1.50, and corks for them ten cents more. I think they would give satisfaction for many purposes.

Canton, Mass.

W. E. Endicott.

Opuntias and Sedums.—The value of hardy *Opuntias* and *Sedums* as garden plants ought to be more generally appreciated. In the heat of summer they bloom finely, and that, too, in situations so hot and dry that few other plants can live there, much less thrive and flower freely. Instead of wilting in the sun, the flowers seem to rejoice in the heat, so that it is a pleasure to look at them. Just now, July 2d, the following are in full display here: *O. vulgaris*, *O. Rafinesqui* and *O. oplocarpa*. These are quite distinct sorts. The first has thick, fleshy joints, with comparatively small, deep yellow flowers; *O. Rafinesqui* has larger and flatter joints and rather larger flowers; *O. oplocarpa* has large, flat, very spiny joints, and its yellow flowers have a bright orange base. Large masses of these plants make a beautiful display. *Sedum album* and *S. speciosum* are also flowering now. Both are creeping or low-growing species. *S. speciosum* has rosy pink flowers, a rather uncommon color in the genus, and it is one of the best of all, both for its color and its profusion of flowers.

Coronilla varia.—Not many perennial plants flower for so long a time as this pretty leguminous plant. It is of creeping habit, or rather half-climbing, and does its best to clamber over brush when an opportunity is given it. The flowers begin to appear here in mid-June and they continue for a period of two months, and even later on a few flowers are displayed. The flowers, sometimes nearly pink and at other times pale purple, are in little heads of about twenty-five each. Like other plants of this genus, the foliage is usually pea-green. It is a native of southern Europe.

Centaurea macrocephala.—This is also a valuable summer-blooming perennial. The large heads of composite flowers on the various *Centaureas* are familiar to every one. This particular species bears large, clear yellow flower-heads on stems nearly three feet in height. To make an effective display large masses of it should be planted together.

Germantown, Pa.

Joseph Meehan.

Correspondence.

Notes from West Virginia.

To the Editor of GARDEN AND FOREST:

Sir,—This is the time of the year when *Hollyhocks*, *Yuccas* and tall *Lilies* are the most conspicuous ornaments of the garden. A few *Hollyhocks* were planted five or six years ago on ground enriched by an old woodpile, and since then they have been left to themselves. Here they have increased and multiplied in the rich soil, sending up many seedlings every year and grouping themselves in beautiful colonies. All shades of *Hollyhock* bloom are here, from white through the palest flesh tints to deepest maroon, varied by buff and lemon-tinted

flowers. All are in perfect health, and having crowded out the weeds that originally fought with them for mastery they are now in full possession of the soil. Hollyhocks are ideal plants for waste places such as this.

Here at Rose Brake we like to use a good deal of discrimination in the arrangement of flowers so as to make them blend harmoniously, and we are fond of scattering herbaceous and even some annual plants among our shrubberies. Thus, a group of spring-blooming shrubs in a prominent position is now carpeted with yellow and orange *Nasturtiums*, while tall orange-colored *Milkweed* is blooming here and there among them. These bright flowers, shining amid the healthy green of the shrubbery, form a charming picture which would be quite spoiled, it seems to us, by the admixture of any other color.

In another place the deep red *Monarda didyma* grows luxuriantly among some Oak-leaved *Hydrangeas*, now in full flower, and here the large creamy trusses of *Hydrangea* bloom contrast well with the rich carmine of the *Monarda* flowers. These simple effects are much more satisfying to the eye than the bewildering jumble of discordant colors seen in so many gardens, which want of space and a desire for great variety combine to spoil.

Spigelia Marylandica is a pretty companion for *Monarda didyma*, and is now in full bloom. It should be planted in partial shade as it does not thrive in full sun, and it needs a deep, rich, moist soil. The latter condition we have to supply by frequent watering and mulching, as none of the soil on our dry hillside can be called moist. The *Spigelia* belongs to the small family of *Loganiaceæ*, of which *Gelsemium semper-virens*, the so-called Yellow *Jessamine* of the south, is, perhaps, the most conspicuous member. The *Spigelia* is about a foot in height and bears numerous beautiful tubular blossoms of bright red lined with yellow.

Foxgloves have been very fine this year, and are now passing. These are best away from scarlet flowers, as their tall spikes of purplish pink blossoms do not harmonize with red. But the tall pure white *Foxgloves* are effective almost anywhere, and especially when seen in bold groups with a background of dark foliage they have a stately effect and remain a long time in flower. All *Foxgloves* are easily raised from seed and bloom the second year after planting. We plant ours in the open in April, where they take care of themselves; all the attention they receive is an occasional stirring of the soil around their roots and thinning where they are too thickly planted.

Rose Brake, W. Va.

Danske Dandridge.

Dodder in Clover.

To the Editor of GARDEN AND FOREST:

Sir,—Two letters within the last twenty-four hours have been received at this station, with samples accompanying each, in regard to *Dodder* upon *Clover*. There is a mingled feeling of wonder and fear expressed in both of the communications, and as *Clover Dodder* is not a widespread and common enemy in this country a note on the subject may be useful. Last year I sent a brief article to GARDEN AND FOREST concerning *Dodder* upon the *Onion* and *Eggplant* on some large truck farms. And now one correspondent writes that while cutting his *clover* "the machine would suddenly enter a thread-like mass which clogged it completely. After cutting, the mass soon wilted and formed a sort of blanket which could be rolled up. . . . There were about fifteen of these beds, averaging six feet in diameter to the acre. Since cutting (some ten days ago) the *Clover* has made a good start over the entire field, except where this growth occurred. In these beds everything is as dead as if burned over with fire. Around the edges of these bare patches a new growth of this fibre has started vigorously, and if not checked may overrun the whole field." The second complaint speaks of the growth as found in spots all over the field, "forming a dense mat, almost obscuring the *Clover*-stems when cut off. . . . In some places the *Clover* is killed."

These extracts show how active the *Dodder* may become when once it gains a foothold in the *Clover*-field. Of course, both writers ask how the growth got into the field and what is the best method of eradicating it. In the one case the land bearing the *Dodder* has "been under cultivation for fifty years." The other was pasture for twenty years, and then plowed for *Corn*, followed by *Wheat* and *Clover*.

The seed of the *Clover Dodder*, *Cuscuta epithymum*, is nearly the same shape as that of the *clover*, but not more than one-fourth as broad or long. It could be easily separated from the *clover* by an ordinary fanning-mill with properly adjusted sieves. It is not unlikely that it came in with manure. Under

the circumstances it is impossible to be certain as to the way the entrance was made.

The fact that it is a seed-bearing parasitic pest should put all who have the *Dodder* in their fields upon their guard against permitting the seeds to get into the manure. All patches of the plant should be raked up and burned along with any *clover* to which it may be attached. It is worse than a weed because it grows upon the plant and demands specially thorough treatment.

Experiment Station, New Brunswick, N. J.

Byron D. Halsted.

Pear Blight.

To the Editor of GARDEN AND FOREST:

Sir,—I send you some twigs of a *Pear*-tree on which the leaves and young fruit seem to be affected with some disease. Will you please tell me specifically what it is and how it should be treated?

Jenkintown, Pa.

G. F.

[This is the well-known fire-blight which is now supposed to be due to a bacterium which enters the plant through the tender parts of the tissue, like the flower-buds or young leaf-buds as they unfold, and spreads down through the branches. When it appears on the main branches it is often called "body blight," and its presence is marked by brown and lifeless patches which become sunken. Wherever the blight appears the limbs should be cut off at once below the point where the infection has reached, and as a precaution against the spread of the disease the prunings should be burned.—Ed.]

Two Insect Pests.

To the Editor of GARDEN AND FOREST:

Sir,—Upon a fine young *Butternut*, planted two years ago in a natural grove of *Oak* and *Hickory*, I lately discovered signs of the destructive work of some insect. The leaves were yellowing and worm-eaten and many of them falling. Closer examination showed that the mischief was due to worms about an eighth of an inch in length, their backs tufted with a snowy white filamentous growth resembling cotton or wool. Professor John B. Smith, the Entomologist of the New Jersey Agricultural Experiment Station, to whom samples were submitted for identification, writes that the insects are ordinarily rather rare, and that this is the first time he has met with them in this state. The species is known as the *Butternut woolly worm*. It is the larva of one of the sawflies, and will succumb readily to an arsenical spray. Even a weak mixture like one pound of Paris green in two hundred gallons of water will be sufficient to kill off the insects if they are really abundant enough to be troublesome. The tree in question is the only *Butternut* known to exist in the neighborhood, and it would be interesting to learn how its natural enemy has discovered it so quickly.

Phytomyza Aquilegiæ, after resting from its labors last season, has now begun active work upon my large collection of *Columbine*-plants. There was not a sign of it until about ten days ago, but now the leaves are badly mined, showing in curious tracery the meanderings of the grub. It is an aggravation that no insecticides avail against this insidious footless pest. The *Columbines* blossomed in all their glory, however, before the attack began.

Inwood, New Brunswick, N. J.

S. de L. Van Rensselaer Strong.

Gardens for Public Schools.

To the Editor of GARDEN AND FOREST:

Sir,—In your issues for May 5th and April 21st are articles on school gardens, based on some work done at the Cornell Experiment Station, and they give the impression that this is the first experience of the kind in America. You say, "a correspondent writes to inquire why the obvious plan of having a garden attached to every school has not been suggested." Your correspondent evidently is not aware that the Massachusetts Horticultural Society has been suggesting this for six years past and has sent out thousands of reports on gardens connected with schools near Boston. I send you a prize list as an evidence of the work done by the Massachusetts Horticultural Society since 1891.

Roxbury, Mass.

Henry L. Clapp.

[The list contains a schedule of prizes for school herbariums, and the society also offers one prize of \$15.00, one

of \$12.00 and one of \$10.00 for gardens stocked with native wild flowers, such as Ferns, Grasses, Asters, Golden-rod, native shrubs, economic plants, such as grains, vegetable roots, leguminous and cucurbitaceous plants. What are known as ornamental plants commonly cultivated in gardens are not admitted into the school gardens for competition. In determining the prizes reliance is placed mainly on the principals in charge. The names of the plants and the uses actually made of them must be accurately described.—[Ed.]

Recent Publications.

Mountain Climbing. Charles Scribner's Sons. New York. 1897.

In this torrid weather a table of contents, with chapters on Mount Washington in Winter, Mount St. Elias and Its Glaciers, A Thousand Miles Through the Alps, and The Ascent of Mount Ararat, ought to have some refrigerating influence. The illustrations show fields of everlasting snow, with cliffs and peaks of ice, frost feathers everywhere, and fur-clad climbers who only seem to need the exhilarating influence of a blizzard to make them entirely happy. These illustrations, of which there are something like a hundred, are, as a rule, unusually effective, although they differ very widely in character, and range from those which show the delicacy, refinement and finish of Mr. Jaccaci's touch to the mechanical but thoroughly good reproductions of photographs in which the engraver's tool has turned the half-tone into a genuine work of art. There are seven articles in all, written by Edward L. Wilson, Edwin Lord Weeks, Mark Brickell Kerr, William Williams, A. F. Jaccaci, H. F. B. Lynch and Sir W. Martin Conway, and they have been gathered together into this volume from the pages of *Scribner's Magazine*, where they first appeared at different times. The essential unity of the book is found in the spirit of the mountain climber which pervades it, and this is one the world over, from Ararat to St. Elias. There is the same joy of battle with the forces of nature, the same exhilaration at conquering dangers which are by no means imaginary, the same cheerfulness and good humor which is essential to success, for, however querulous or pessimistic a mountain climber may be elsewhere, when he is once above the clouds with his life in his hands and toes he is the most genial of comrades, the most devoted and self-denying of friends. All the chapters are well written, and one almost gets a surfeit of panoramas of desolation, vast silences and solitudes of ice the yawning blackness of bottomless chasms, and winds and storms which enjoy themselves in a wilder way than they do anywhere within a mile of the sea-level. Other travelers occasionally take pains to tell something of the life of the regions they explore; they make friends with trees, shrubs and humbler plants, and with the animals, birds and insects which they encounter; but the mountain climber scales his peak and sees little else but the mountain and the broad features of the earth which are spread out beneath his feet. This lack of scientific investigation, however, can be forgiven, and, indeed, drudgery of this kind seems too prosaic for these pilgrims possessed with an absorbing passion. The stimulus of the mountain climber is really a moral one, and anything so earth-born and unimaginative as a longing for knowledge would seem to be altogether too tame to make an effective appeal to his adventurous spirit. Physical trials like those which face the confirmed mountain climber can only be overcome under such excitement as the soldier feels when going into battle. Altogether, it is a pleasant book to pick up, and one can hardly read a page without coming on some such passage as this in Sir W. Martin Conway's chapter entitled "A Thousand Miles Through the Alps":

The finest scenery in this part of our journey at the west end of the famous Bernese Oberland was that of the glacier of the great Dead Plain. We did not see it until we were on its edge and the white expanse spread before us. It fills an elliptical hollow some two miles long by a mile wide, and once

on its smooth large surface the external world is shut out by a ring of low mountain wall. Not a trace of human activity can be seen in any direction. The largeness, simplicity and seclusion of this strange snow-field make it unique. We traversed its longest diameter, and the hard surface was beautifully rippled and perfectly clean.

Current Literature.

An interesting monograph on the Peach industry in Pennsylvania has been prepared by Professor Butz, and published as Bulletin No. 37 of the Agricultural Experiment Station of that state. The industry is only twenty-five years old, and yet the area in Peach orchards in Pennsylvania is estimated at 11,000 acres, or something like 2,000,000 trees all told. Most of these are found in three or four counties in one or another of what are known as the Peach belts of the state. The largest of these sections is the Juniata Peach belt, located principally in Juniata County, but extending into Mifflin, Perry and Snyder counties, comprising together some 3,500 acres. The next largest district is the South Mountain belt, lying within Franklin County, but extending across Maryland to the Potomac River. In both these belts the orchards are on hills, the latter embracing the western slope of South Mountain, where there are now planted some 400,000 trees, with the prospect that the entire slope will soon be devoted to this industry. There are single orchards that contain from 6,000 to 8,000 trees, and one orchard contains at least 10,000.

The one hindrance to Peach growing in Pennsylvania which cannot be entirely overcome by human foresight and effort is the winter-killing of fruit-buds. It is not the degree of temperature only which causes this destruction, but several other obscure conditions, besides unripened tissues and drought. A more or less complete failure of fruit by winter-killing seems to happen at least once in four years. While there are many insects which are enemies to the Peach, the only one to be dreaded seriously is the borer, and this can be controlled by careful examination in spring and fall, and when an attack is discovered the offender is dug out with a knife. This is tedious work, and it requires to be done by a trusty man, but the remedy is sure. The mysterious disease known as the yellows is working an increasing amount of damage. It is contagious, and no one knows a remedy for it. Whenever a tree shows symptoms of the malady, even if it is young and strong, the trunk is blazed and the next winter it is cut down and burned. If these things are attended to and the ground is stirred every year from May to July inclusive, a paying crop can be counted on. Fertilizing with potash salts and phosphates, with Crimson Clover or some other leguminous crop to gather nitrogen, has proved remunerative, and, of course, the practice of thinning the fruit has proved beneficial here as elsewhere, not only to the immediate crop when quality and profit are considered, but also in preserving the health and vigor of the trees. The practice of using smaller packages is growing, and the so-called Michigan basket, with a handle, a raised lid and a capacity of twenty pounds, is favorably spoken of. There are more small families than large ones, and purchasers more frequently want a peck or a half-peck than a bushel, and they will therefore more readily buy a small package which they can conveniently carry away than a larger one.

Among the most profitable varieties which ripen in the South Mountain belt from September 25th to October 17th are the White Heath Cling, Salway, White Heath Freestone, Bilyeu's October and Levy's Late. Varieties which prove good on both high and low land are Crawford's Early, Crawford's Late, Mountain Rose, Reeve's Favorite, Moore's Favorite, Old Mixon Free, Stump, Chair's Choice, McAllister and Fox Seedling. Susquehanna is a variety which originated with a Mr. Griffith in this state; it is a large yellow-fleshed, red-cheeked peach of superb quality and ripens late in August. The tree is not a prolific bearer, however, and therefore it is not often planted for market. In

commercial orchards planters remember that the market prefers yellow-fleshed peaches to white-fleshed ones, even though the latter are of better quality. Peaches like Mountain Rose and Bilyeu's October are white-fleshed, it is true, and they are planted, but this is because of their productiveness. A cling-stone peach should be avoided as one avoids an enemy. The only clingstone planted largely in Pennsylvania orchards is Alexander, and this is tolerated because it is the earliest to ripen.

Notes.

Tender asparagus is scarce and sells at twenty-five cents a bunch. Sweet corn, from New Jersey, is as yet immature, and the best seen last week came from North Carolina. Tomatoes seem uncommonly poor, and, although they now come from near-by fields as well as from the south, they are too costly for general use and are sold by the pound and quart. Many are sun-burned and blistered. The first Lima beans, from Florida, were offered last Saturday.

The annual report of the City Parks Association of Philadelphia has just come to hand, and it seems to be a record of considerable success in the useful work of securing open spaces, planting trees, providing playgrounds and saving, so far as can be, the natural beauties of the land over which the city is extending. Since the establishment of this association something like thirty pieces of ground have been secured, ranging from thirty acres in size, downwards, and it is hopeful that the disused burial grounds of the city will soon be thrown open for public use, and that funds for the proper development and management of the recently acquired grounds will be obtained.

According to the *Washington Star* more than 20,000,000 packages of seeds have been distributed by the Department of Agriculture this season, at an expense of \$130,000, each member of Congress having 40,000 packages to dispose of. There were more than a million packages of flower seeds, nearly half a million packages of field seeds, and, of course, vegetable seeds in great variety. Thirty-two kinds of beans, twenty-three kinds of cabbages, thirty of lettuce, and nineteen of muskmelons indicate the wide range covered by the list. The entire amount of seed distributed would have planted more than three hundred and fifty square miles, the largest distribution ever attempted by the Department. The *Star* might have added that this is one of the most disgraceful swindles ever perpetrated by a civilized government.

A correspondent of *The Gardeners' Chronicle* praises several named hybrid *Hemerocallis* which have been produced by a Mr. Yeld, of Clifton, Yorkshire, from crosses between different species of this genus. Some of these are described as valuable plants, and one of them, a hybrid between *H. flava* and *H. Sieboldii*, is said to be remarkably showy and distinct. It grows vigorously, has sturdy flower-stems thirty inches high, each bearing eight or ten orange colored flowers four inches in diameter and three inches long. The buds are a brownish purple and highly polished, and this color is retained on the outer segments after the flower has fully expanded. The prolific character of the plant may be estimated from the fact that in a space about two feet square forty flower-stems were carrying something like 360 flowers. The different species of *Hemerocallis* are so beautiful that they offer a most promising field for the hybridizer.

Mr. W. Botting Hemsley states in *Knowledge* that the characteristic form of the tall-growing Gum-trees of Australia is a massive trunk, branchless to a great height, and a comparatively small crown, with the ultimate branches slender and drooping. In some species the bark is smooth and polished like that of the Beech; in others it flakes off, as in the Plane-tree. The Blue Gum, *Eucalyptus globulus*, although it is less than half a century since its value began to be realized, probably has a more extensive literature than any other tree. *E. amygdalina*, in its fullest development, is probably the tallest of trees. A prostrate tree of this species was found to be 420 feet long and 295 feet up to the first branch, where the trunk was four feet in diameter, and at 360 feet it was still a yard through. The Karri, *E. diversicolor*, and the Jarrah, now used extensively for street paving in London, are both trees of enormous magnitude. There are many records of trunks between twenty and thirty feet in circumference at five feet from the ground, and Mueller mentions a buttressed Jarrah-

tree which girthed sixty feet at six feet from the ground. It may be added that a cubic foot of green Jarrah wood weighs seventy-five pounds, and when dry about sixty pounds.

The recognized method of destroying weevils and other seed-infesting insects which cause serious loss to seed and grains both for sowing and for food purposes, is to treat them with the fumes of carbon bisulphide at the rate of one pound to a hundred bushels. This chemical is a colorless liquid, but when exposed to the air the sulphur and carbon separate, each uniting with the oxygen, forming carbon oxide and sulphur dioxide, the latter of which is a very poisonous gas with a disagreeable odor. To ascertain whether seeds treated with this chemical lose their germinating capacity an experiment was made by the Division of Botany in the Department of Agriculture, in which seeds were exposed to a saturated atmosphere of carbon bisulphide for forty-eight hours. They were then placed in a germinating chamber in which check lots of untreated seed were also tested. The result was that the germinating percentages of almost all the seeds treated and untreated were the same, although in barley, rye, wheat, corn, crimson clover, millet and rice this extreme treatment caused some injury. The varieties which were damaged by an exposure of forty-eight hours were then put to another test of twenty-four hours' duration, and the result seems to be that in general the seeds of cotton, peas, beans, buckwheat, oats, the cabbage family and cow peas will endure severe treatment with the fumes of carbon bisulphide without losing their germinating quality to any appreciable extent, while on the other hand seeds of corn, wheat, rye and crops belonging to the grass family, except Kaffir corn and oats, should be treated with caution, since a deterioration in vitality is likely to result from excessive exposure to the gas.

The great quantities of beautiful California cherries which have made so bright a showing on the fruit-stands for a month past are steadily decreasing, and only small consignments of Oregon, Royal Anne, Black Republican, Black Tartarian and Black Bigarreau came last week in fifty-two car-loads of fruits from the Pacific coast. Bartlett pears are now of good size, as are Clapp's Favorite, and good California peaches are fairly plentiful and include such varieties as the favorite early Alexander, the juicy white-fleshed Hale's Early, Governor Garland, the choicest of all the early peaches, and having delicious flavor and fragrance; Briggs' Red May, a standard early sort since 1870, and the highly flavored yellow St. John. There were Royal, Silverskin, Moorpark and Blenheim apricots, and some showy large Red Astrachan apples. Plums and prunes were never so plentiful here and so varied in color and form, and this fruit comprises the bulk of the great quantity now arriving. Among the popular and highest-priced varieties now in season here are the medium-sized, dark purple Tragedy prune, with rich, sweet yellowish green flesh; the French Peach plum, large, roundish, with shallow suture, and varying in color from salmon to brownish red; the reddish flattened Simoni plum, with deep cavities at base and apex, and apricot-yellow flesh of aromatic flavor; Burbank, a very large, nearly globular plum, rich cherry-red in color, slightly mottled with yellow and freely dotted with the same color, having a distinct flavor. Ogon, Abundance, Parsons' Early, Clyman, Royal Hative, St. Catherine, Wickson, Purple Duane, Washington, Pedro, Hungarian, Yosabi, Satsuma and Botan are all seen and make a remarkable display of color and form. Fresh figs are also more abundant than in any former year, and sell as low as 60 cents a dozen. The leading late varieties of peaches are now coming from Georgia, but these are hardly up to the average in quality, owing to curculio sting, and sometimes to decay. Exceptionally large Georgia peaches known as Belle sell for \$1.00 a basket holding twenty of the fruits. Strawberries, raspberries, currants and other small fruits proved very perishable during the hot days of the past week, and while good fruit cost the householder ordinary prices, large quantities of soft berries were bought up by makers of jams and syrups at unusually low rates. Lemons advanced \$1.00 a box as a result of the hot weather, and the best Palermos brought \$5.12½ wholesale at auction. Nearly 200,000 boxes of this fruit are on the way from the Mediterranean, but only two cargoes are expected here this week, so that if the heat continues even higher prices are certain. The shortened supply of bananas from Cuban ports has been made good by extra shipments from Central America, and during June 561,000 bunches were sold in this city to retail dealers, an increase of 31,000 bunches over the amount handled in the same month a year ago. A few of the delicate little Lady-finger bananas were among these importations and are occasionally seen in the fancy-fruit stores.

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Legislation Against Plant Pests.

THE brown-tail moth is not a rare insect, and it has been known to entomologists for many years as *Liparis* (or *Porthesia*) *chrysorrhœa*. It has never been known in America, however, until the spring of the present year, when it was detected in Somerville, Massachusetts, and since it is almost as omnivorous and destructive as the gypsy-moth, to which it is closely akin, the discovery of the new immigrant caused something of a panic. The Governor of the state wrote a special message of warning, and about a month ago a law was approved which aims to compel local authorities to take active measures for its suppression. The law provides that whenever this pest shall be discovered in a city or town of Massachusetts the local government shall take immediate steps to destroy it and prevent its spread. If they are in doubt as to the identity of the insect they shall notify the Board of Agriculture, which Board thereupon must inspect the region and supply printed directions setting forth the most approved methods for the confinement and extinction of the insect. Owners and managers of infested premises, as well as mayors and aldermen and selectmen of infested towns and cities, who neglect or refuse to comply with the requirements of the act are subject to fine or imprisonment. If this moth is still confined to a small section of the state the effort to suppress it may not be utterly hopeless. But it may have been half a dozen years ago when it was imported, and further examination may show that it has been widely distributed, so that we ought not to be too sanguine about its utter extermination.

But, whatever the merits of this particular law against this one pest, it is certainly worth while to discuss the general principles upon which legislation against insects and fungi injurious to vegetation ought to be based. We legislate against contagious diseases of man by quarantine, by enforced vaccination and by other sanitary regulations. We have laws for stamping out infection among domestic animals. Almost every state in the Union makes it a misdemeanor for a landholder to allow noxious weeds, like the Canada Thistle, for example, to go to seed on his premises. The principle which underlies all these laws is the same as

that which holds the owner of a Cranberry-bog in New Jersey responsible for the scald on his plants, and which in a dozen states compels the destruction of Peach-trees affected with the yellows, or Plum-trees with the black-knot. The assumption is that no man has a right to permit his premises to be a breeding-ground for pests which will bring loss upon his neighbors, when by due diligence he can prevent this. If the trouble does not come from his own carelessness it is right that the state should pay him, as it pays for the destruction of diseased cattle.

But if we admit that legislation against plant pests is justified on this ground, our laws may only be effective to a limited extent. If New York enacts and attempts to enforce a law against the San José scale, for example, what is to prevent an invasion of these insects from adjoining states where there is no restriction upon its spread? To meet such a difficulty Federal legislation has been invoked, and this might be effective with state coöperation as it was when Congress authorized the Department of Agriculture to eradicate pleuro-pneumonia by slaughtering cattle and paying for them what it saw fit. Massachusetts three years ago asked the General Government for an appropriation of \$100,000 to aid in exterminating the gypsy-moth, but under our system of government such assistance can hardly be hoped for, and unless, therefore, the states all unite in the enactment of similar laws, any attempt of a single state to compel its inhabitants to fight a moth or a fungus is as likely to prove ineffective as was the Papal bull against the comet. Again, state laws against the enemies of plants, however well considered, are liable to failure in execution, because of a sluggish public opinion that refuses to enforce them. Noxious weeds go to seed by every wayside in spite of legislation and governments. Locusts continue to ravage the western states, although their statute books order farmers to plow the land where these insects have laid their eggs. Over and over again juries have failed to convict peach growers when it had been proved that they refused to burn trees affected by the deadly yellows. This is simply because there is not a public sentiment behind the law strong enough to compel its enforcement. The canker-worm and tent-caterpillar have probably done ten times as much injury in eastern Massachusetts as the gypsy-moth, but a public sentiment which is not strong enough to arouse the people to a destruction of these pests would not enforce a law leveled specially against them.

But it does not follow that because the enforcement of a law is not certain, it is therefore unwise to enact it. It is true that habitual disobedience to any law breeds, to a certain extent, contempt for all laws, but it is also true that the expression of the intelligence of a commonwealth on its statute books is of itself an educating force. Laws against forest fires, for instance, help to instruct people who have never given the subject attention as to the enormous amount of property they sweep away. In the mean time nothing should be neglected which helps to disseminate knowledge of plant pests and their ways. It has been estimated that a million and a half of dollars every day would not pay for the losses inflicted upon agriculture throughout the United States from insects and fungous diseases. It matters little whether the exact figure is larger or smaller than this. It is sufficient to know that the tax upon the productive resources of the country from these sources is enormous. If we are not yet prepared to enforce wholesome laws to prevent this loss, we certainly ought to do everything possible toward creating a sentiment which will enforce them. Here are matters which should be subjects of study in the common schools to begin with, as well as in the agricultural colleges and bulletins from our experiment stations and in farmers' institutes. A civilized people cannot afford to go blundering on as we are doing now, when united action would protect us from a great portion of this loss. When we are confronted again by some new enemy like this moth from Europe there ought to be sharp eyed boys and girls in every state who would detect it at once, and their fathers should have machinery

ready for such an emergency, and be able to check the outbreak at its very beginning.

MR. WILLIAM ROBINSON dedicates the fifty-first volume of *The Garden* to the Rev. G. H. Engleheart, who is best known for his work in hybridizing Narcissi. In a note accompanying a good portrait it is stated that Mr. Engleheart has devoted his leisure for the improvement of Narcissi for sixteen years past with even more remarkable success than characterized the work of his kinsman, the Hon. and Rev. Dean Herbert, sixty years ago, for, besides enriching our gardens with new creations, he has studiously traced and verified the almost unrecorded labors of other workers in this field, such as Backhouse, Leeds, Horsfield and others, until the rearing of Narcissi has been brought almost to the precision of an exact science. Mr. Engleheart has remade these seedling forms, so that now, for the first time, we know their pedigree, and in a similar way he has verified the parentage of many wild hybrids and seedlings which have until lately ranked as true species, although Herbert surmised long ago that some of them were of hybrid origin. Many of his hybrids and seedlings have received first-class certificates and many more have received medals and other rewards. The Trumpet Daffodil, Ellen Willmott, is spoken of as the very finest seedling raised, and White Queen, one of the new peerless forms, is almost equal to it. In Red Prince, Beacon, Southern Star and Oriflamme we have intense color added to perfect form and good substance, with cups almost scarlet and crimson. The seedlings of *Narcissus poeticus* are genuine improvements on that admirable plant, being better in form, size and color, while the rather tender hybrids of *N. triandrus* seem to be the perfection of daintiness and grace when grown in pots or in the house.

The Landscape-gardener and his Work.

MR. O. C. SIMONDS, of Chicago, who prefers the title of Landscape-gardener to that of Landscape-engineer or Landscape-architect, published an article in a recent number of *Park and Cemetery* which contains a good statement of certain elementary principles in his art. Some of the more important passages in this paper are here reproduced:

When one considers engineering in connection with landscapes, instead of thinking of any artistic production, one is more apt to think of the scars along mountainsides, of the destruction of beautiful scenery along river banks, of the changing of watercourses into sewers, of railway embankments, canals and dams. The term "architect" brings to mind a man who aims to design artistic structures. His materials are stone, brick, the various metals, wood, glass, paint, etc. If the term landscape-architect had not been used by some of the foremost landscape-gardeners in this country one would imagine it to designate a man who designed summer-houses, pavilions, balustrades, fences, hedges and things with stiff and formal lines. On the other hand, the term landscape-gardener has, first, "landscape," which, as defined by Hamerton, implies a consistent picture, and "gardener," which indicates that the materials used will be those found in a garden. The objections made to this term come primarily from those who regard a garden as a place in which to raise vegetables for the kitchen, but garden, which meant originally an enclosure, has long signified a place that gives pleasure by the arrangement and beauty of its trees, shrubs and flowers. Mrs. Van Rensselaer has happily called the pleasing effects produced by judiciously arranged masses of foliage, flowers, lawns, water and varied land surfaces, Art Out-of-Doors. To become acquainted with the principles and literature of this art one must read what Repton, Loudon, Downing, Kemp, Robinson, Olmsted, Parsons, Mrs. Van Rensselaer and others have written on landscape-gardening. So far as I am aware no one has written a book on landscape-architecture.

What are the attainments of a skillful landscape-gardener? He follows a fine art which appeals to the eye and has to do with what we see as we pass along residence streets, boulevards and parks. His art applies to any outdoor scenery which can be affected by the hand of man. It is of the first impor-

tance, therefore, that he should know how to arrange the ground surface, the trees, shrubs and other plants, the ponds and streams, the points of view and the open spaces or vistas, so that the general effect will be pleasing. No matter how great his knowledge of soils, of drainage, of road construction, and of the structure and characteristics of the various species of plants may be, if he fails to make an artistic arrangement he is not a landscape-gardener.

Next in importance to a knowledge of arrangement comes the ability to produce a result which, with a reasonable amount of attention, will continue to improve with added years of growth. This ability will rest in part on an acquaintance with the habits and life-history of the plants used and of the situations to which they are adapted.

The proper location of the points of view will require a study of the relations of buildings, drives and walks to the landscapes. Where the landscape is an important feature the landscape-gardener should work with the architect in the preparation of the preliminary sketches. Unfortunately, architects frequently design residences and other buildings without any regard to the site and the characteristic features which may have attracted the owner. Cases are not unknown where houses have been so designed and placed that the kitchen and servants' rooms shut off the very best views from the family living-rooms.

A landscape-gardener should be skilled in what Mr. Olmsted calls "the anatomical plan." He should not only be able to place drives where they will command good views while not interfering with the landscape, but he should know how to place them so they will be convenient, with easy grades and proper drainage, and how to construct them in a durable manner with a satisfactory wearing surface. He should know how to economize in regard to space and the cost of the work coming under his direction. While he should have no pecuniary interest in any work that is carried on—that is, should have no interest in any nursery or greenhouse or act as agent for any firm—he should usually purchase the material furnished by nurserymen on account of his knowledge of what is required, the prices that should be paid and the standing of the various nursery firms. He will often be able to save an owner several times the amount of his fees by his knowledge of the value of plants. His work should commence with a study of the adaptability of a given piece of ground for the purpose intended, especially when that purpose is the making of a park, a botanic or public garden, a cemetery, home grounds or the location of a public street. The ground in question may have features which would be of great importance in the design to be worked out, such as an important view of a large body of water, a valley or a distant stretch of country, a grove of trees which would require many years to grow, a rocky ledge, a steep bluff or a ravine, or it may lack valuable features which could be secured by the selection of another piece of ground. When the site is finally selected, a thorough study should be made of its characteristic features and of all the surroundings, and after such study the landscape-gardener should have as clear a conception of the effect he wishes to produce, of its appearance when the first planting shall have been done, when one, two, three, ten years have elapsed, as a painter has when he begins work on a canvas. Not only that, but he should have in his mind the various effects of spring, summer, autumn and winter.

Having made his design, and perhaps sketched it on paper ("perhaps," because a sketch is not always necessary, and there are cases in which the best result will be produced by working directly on the ground), he proceeds to execute it just as his brother artist proceeds to paint a picture, but instead of putting a background on canvas he shapes the actual ground, mixing with it compounds of nitrogen, potash, phosphorus, etc., which, dissolved in the rain, by the aid of the warmth and light of the sun, will afterward produce the desired colors. The landscape-gardener, however, does not select his colors directly. If he wishes a dark green carried up from a given place on the ground he chooses a Maple, or if the green is to continue through the winter he chooses a Pine as his servant to gather the materials already found or placed in the ground. If he wishes a red in winter he chooses a Dogwood, which will put this color in its bark, or if he wishes a red in summer he may choose a Rose. By choosing the right number and kind of such helpers a great mass of color may be carried high into the air, or spread out on the ground like a carpet.

Whether the living picture, as a whole, will be satisfactory or not will, however, depend upon the choice of material made by the landscape-gardener, provided his supervision is continued for a long enough time. The continued supervision is required because it takes time—in some cases years—

for the various trees, shrubs, vines and herbaceous plants to do their part in making the picture. More are needed at the commencement than are needed later. They are not large or strong when first assigned their places. Some may become sick or they may crowd their neighbors. The owner of a place or his man in charge, or the superintendent of a park, may have failed to grasp the features of a design, and so have made changes detrimental to the final result. Few members of the profession, to say nothing of the clients, have appreciated the importance of an oversight extending through a series of years. The architect's work is finished with the completion of a building; the painter's when he puts his last touches on a canvas, but what the landscape-gardener must have in mind is not a single picture, but a series of pictures having more or less resemblance to each other, changing more rapidly with the first than with the later growth, and needing from time to time the inspection and criticism of a trained eye. This inspection may be made by visiting a place once a year, once a month, or even more frequently, as may be agreed on with the client, but it should not be omitted.

Perhaps no work of an artistic character requires a broader knowledge than that of landscape-gardening. Besides the creative faculty of a designer, it calls for some acquaintance with engineering, architecture, horticulture, botany, the adaptability of different plants to various climates and soils, their appearance, their rate of growth, their length of life and the social habits of the people to whom they will give pleasure. Of course, his knowledge of engineering or architecture will not be as extensive as that of men engaged in those professions, but it will be such as will enable him to bring the bridges, buildings and other constructive works into harmonious relations with the landscape.

The Madroña at Ukiah.

EVERYWHERE in California *Arbutus Menziesii* is known by its musical Spanish name of Madroña, pronounced with a soft "d." While found from Puget Sound to Mexico, it is in the region between San Francisco Bay and Oregon that the Madroña is at its best. Elsewhere it is oftener a shrub, here frequently a tree of considerable dimensions, specimens two or three feet in diameter being common, and one noble tree near San Rafael is said to be twenty-three feet in circumference at base.

In Ukiah Valley it is very common, extending from the dry uplands to the mountain tops, and almost exclusively covering some considerable areas on the mountain slopes. The town of Ukiah is built on a sloping upland, which was originally covered with timber, a mixed growth of Douglas Spruce, White Oak, Black Oak, Black Live Oak (*Quercus agrifolia*), Manzanita and Madroña. The founders of the town, with rather unusual good taste for pioneers, spared the native trees, and they have thrived wonderfully under the changed conditions. Trees in variety have been planted, and sidewalk trees are the rule rather than the exception. Viewed from any quarter now, the town seems hidden in a forest.

The Madroña formed a large part of the original undergrowth. A few were large trees, but there were a multitude of seedlings and many clumps of sprouts from old stubs. All have grown well, and are now beautiful and symmetrical trees, the most attractive feature of our town. Many blocks are covered with fine groves of them.

As an ornamental tree the Madroña has many virtues and a few vices. With its large elliptical leaves, suggestive of the Rhododendron, its sweet flowers in May and its glory of red berries in midwinter, it is always beautiful. No less charming are the smooth limbs left clean and shining in their rich brown coat, as the old bark sheds each summer. The leaves are shed in May and June, after the new leaves have formed. The contrast between the bright green of the new and the yellow of the old is fine, but the litter of leaf and bark is objectionable, and perhaps a little more so because the leaves do not fall as part of the general decay at the close of the year with those of deciduous trees, but at a season when all vegetation is in the full tide of life.

Ukiah, Calif.

Carl Purdy.

Foreign Correspondence.

London Letter.

VICTORIA REGIA.—A considerable range of variation has already been revealed under cultivation by this, the queen of Water-lilies, and two forms of it at least have been named—*Randii* and *Dixon's* variety. The latter is remarkable for the red tints of its flowers and for the size and depth of the rim of the leaves. A well-marked variety, new to cultivation so far as this country is concerned, is now flowering for the first time at Kew. It was raised from seeds received in January from Mr. Tricker, of the nurseries of Mr. H. A. Dreer, Philadelphia. Among its peculiarities are, first, the early cupping of the leaves, the turned-up rim being shown by quite small plants, while when full grown the leaves are large, of a lustrous bright green color, and the rim is from six to eight inches deep. The flowers produced up to the present are not quite equal in size to those of the ordinary form, but they open several hours earlier in the day and they change color earlier. Usually the sepals of *Victoria* are spinous to the tips, but in this variety they are quite glabrous. Mr. Tricker states that with him the plant grows very freely and that during the summer it is not unusual to have fifteen or twenty good leaves on a single plant, and frequently two flowers open together, a first and a second day flower. He has also had plants that flowered when in comparatively small pots and a perfect flower produced on a plant in a twelve-inch seed-pan. The plant at Kew is growing along with one of the ordinary variety and one of *Dixon's* variety, and it is by far the strongest and most attractive in leaf characters, while it has already developed three flowers before the others have shown signs of any. It is noteworthy that these varieties of *Victoria regia* come true from seeds, so that their characters are fixed. Probably Mr. Tricker can furnish particulars of the origin of his variety.

CAMPTOSEMA PINNATUM.—This handsome stove shrub or small tree has an erect woody stem, pinnate leaves over a foot long, each leaf consisting of three pairs and one terminal ovate leaflet, ten inches by three, of a bright green color. In habit and leaf characters the plant is not unlike a young American Ash. The flowers are borne in short axillary racemes resembling those of *Erythrina caffra*, but shorter, each raceme consisting of about a dozen flowers, which are two inches long, the calyx green, mottled with purple, and the corolla rich rose, changing to rosy mauve. There is a plant of it a yard high now flowering for the first time in the Palm-house at Kew; it was raised from seeds received from Brazil nine years ago under the name of *Camptosema erythrinoides*. The genus is composed of ten species, mostly climbers, all natives of Brazil. *C. rubicundum*, a climbing species with red flowers, was in cultivation here sixty years ago, when it was figured in *The Botanical Magazine*, t. 4608, and also in *Paxton's Magazine*, where it is called a *Kennedya*. It is not known to be in cultivation now.

EULOPHIELLA PEETERSIANA.—A plant of this extraordinary Orchid has been established in Sir Trevor Lawrence's collection, where I lately saw it growing vigorously. It has made three rhizomes about nine inches long, on each of which are about a dozen leaves, each from three to four feet long and three or four inches wide, of firm, almost leathery texture and plicate. It is a most distinct-looking Orchid, undoubtedly a *Eulophiella*, a photograph of the flower showing all the characters of that genus as known in *E. Elizabethæ*. The flowering of this plant is awaited with curiosity. I am told that Monsieur Peeters, the Brussels Orchid dealer, to whom we owe the introduction of this Orchid from Madagascar, has also succeeded in establishing plants of it.

DENDROBIUM CÆLESTE.—A blue *Dendrobium* would be a decided acquisition, and if the species described under this name in *The Gardeners' Chronicle* for this week is all that it is said to be, its introduction will be awaited with considerable interest. It has been discovered in the Philippines

at an elevation of about 8,000 feet, where Oaks, Rhododendrons, Myrtles, etc., are its companions. In habit it is said to resemble *D. Victoria Reginae*, another new discovery of this year and also a native of the Philippines, described as having stems which produce "great numbers of richly dark blue and white blossoms borne in trusses and lasting in bloom for several weeks. The flowers are over an inch in diameter, the sepals and petals white at the base, with a great blue blotch at the edges, the lip ovate-oblong and of the same color." In *D. coeleste* "the fleshy flowers are entirely dark blue, with the exception of the ovary and spur, which are purple. The sepals and petals are ovate and almost equal in size, the lip obovate and blunt, the column blue." These two species are described by Mr. A. Loher, Manila.

INCARVILLEA DELAVAYI.—The most vigorous example I have seen of this fine Bignoniad is in the garden of Sir Trevor Lawrence, at Burford Bridge, where it is grown out-of-doors in a sunny border all summer and lifted and kept in a frame in winter. Under this treatment it develops leaves two feet long and spikes four feet high, clothed with flowers proportionately large and rich in color. According to a note in *The Garden* this plant is hardy enough to thrive if left permanently out-of-doors in most parts of England, for in Dalbeattie, near Dumfries, seeds sown two years ago have yielded plants which were in great beauty in June this year after having stood the last two winters in a climate not very suitable for tender things. It will be remembered that this plant was introduced from China by the missionary after whom it is named and that it first flowered in Paris in 1893. It is now easily obtained from the nurserymen.

TEA ROSES AND VIOLAS.—In a notice of Tea Roses grown by Mr. Robinson at Gravetye last year, I mentioned the excellent effects produced by planting bedding Violas (tufted Pansies) as a carpet or mulch to the rose beds. A series of beds of Teas has been planted this year bordering a curved walk against an old Yew hedge, and among these a selection of bedding Violas has been used. The effect now is most pleasing. Each bed is filled with one kind of Rose and one of Viola. There are no harsh or brilliant colors among the latter, their blues, yellows, creams, whites and piebalds harmonizing well with the whites, creams and pinks of the Tea Roses. The latter are, of course, on their own roots. It is a mistake to plant Tea Roses that have been grafted or budded. Bedding Violas are again the subject of a special trial at Chiswick, where there is now a fine collection of varieties.

London.

W. Watson.

New or Little-known Plants.

Rhamnus occidentalis.

THIS plant was first noticed by Mr. Thomas Howell, near Waldo, in south-western Oregon, and described by him as a shrub from two to ten feet in height, with coriaceous yellow-green elliptical leaves, from acute to obtuse or retuse at the apex, flowers in subumbellate fascicles and black obscurely lobed fruit.* Last September I found it in the same region, but at higher elevations on the north slope of the Siskiyou Mountains, where in dry gravelly soil it forms broad compact round-topped bushes about two feet high and sometimes five or six feet in diameter, being in habit quite unlike any of the forms of *Rhamnus Purshiana*, to which it has sometimes been referred,† and from which it also differs strikingly in the yellow-orange color of the under surface of the leaves, similar to that of the leaves of *Rhamnus crocea* of southern California, a fact which has already been pointed out by Professor Greene.‡

Our figure on page 285 of this issue, made by Mr. Faxon from specimens which I gathered on the Siskiyou Moun-

tains, will perhaps call attention to this interesting plant, which on further investigation will probably be found to be specifically distinct from the very variable *Rhamnus* of the *Frangula* section of Pacific North America. The leaves are described by Mr. Howell as persistent; probably, however, they fall during the winter or in early spring with the appearance of the new growth.

C. S. S.

An Undescribed *Antennaria* from New England.

IN the spring of 1891 Mr. J. C. Parlin collected at North Berwick, Maine, an *Antennaria* which then appeared very different from the common form, but which has not been critically studied until the present season. Early in May of this year, while botanizing with Mr. Parlin upon the intervals of Great Works River, in North Berwick, our attention was attracted by the stout, viscid, young shoots of a plant which proved to be the same as that collected six years ago. The plant was abundant in the woods or on recently cleared knolls in the interval, and, though still very young, it reminded one, upon a superficial glance, of a *Gnaphalium* rather than an *Antennaria*. At that time, early in May, the common Ladies' Tobacco, or Pussy's Toes, of the fields and meadows (*A. neglecta*, Greene, *Pittonia*, iii., 173) was in full flower, and even passing to fruit.

Later in the spring, in late May and early June, the large viscid plant has been found in great abundance by Mr. Parlin in southern Maine, and by Dr. B. L. Robinson, Mr. E. L. Rand and others in southern New Hampshire and eastern Massachusetts. The plant flowers at the same time as *Antennaria plantaginifolia* (see Professor Greene's paper); and it is interesting that, as in case of two of Professor Greene's recent north-western species, the staminate plant is unknown. Wherever found the pistillate plants have been abundant, but thus far only that form has been detected. Often, however, this species is found growing with staminate or pistillate plants of *A. plantaginifolia*.

Aside from the glandular stem and large cauline leaves and the purplish involucre, perhaps the most striking character is in the bright green smooth and shining upper surface of the strongly discolorous basal leaves. These characters separate the plant very clearly from the other *Antennarias*, and I propose it as a species, which I dedicate to its discoverer.*

Gray Herbarium, Cambridge, Mass.

Merritt L. Fernald.

Cultural Department.

Herbaceous Perennial Plants in Flower.

PROBABLY the finest show made by any herbaceous perennial in the garden now is the glowing mass of flowers borne by a clump of *Alströmeria aurantiaca*. While this plant has flowered here annually for eight years past, at no time has it shown such luxuriance of growth and bloom as it has this season. Although it requires a slight protection in winter in this vicinity, it flowers perfectly without any protection after a mild winter like the last one. Success with this plant depends largely on the situation and the condition of the soil in which it is planted. A slightly elevated position with a warm aspect in a soil of such texture or so drained that it will

* *Antennaria Parlinii*, n. sp. Rather tall, 1½ to 4 dm. high, the stems conspicuously leafy, pubescent with white appressed-silky or even lanate hairs, and bearing elongated purplish glandular hairs, especially toward the base and the inflorescence; stolons rather stout, glandular: old leaves of the basal rosette subcoriaceous, obovate or broadly obovate-spatulate, tapering below to a winged petiole, rounded and generally mucronate at the tip, including the petiole base 4 to 7 cm. long in well-developed plants, 1½ to 3½ cm. wide, smooth and bright green (never arachnoid) above, almost shining in the fresh plant, 3-nerved, beneath canescent or glabrate, wrinkled and with prominent veins; lower cauline leaves ascending or oblong, obtusish, mucronate, glandular on both faces, green above, sordid beneath, 3 or 4 cm. long, the upper reduced; lower leaves of the stolons like the cauline, the terminal ones large, obovate, strikingly discolorous, bright green and smooth above, white and closely pubescent beneath: heads loosely or densely corymbose: the involucre subcampanulate, sometimes fully 2 cm. high, of 3 rows of imbricated bracts; the outer bracts herbaceous, purplish, and somewhat glandular, with short acute or bluntish erose scarious tips; the inner with the narrow scarious tips long-attenuate: styles and corollas purplish: pappus silvery white: akenes 2 mm. long, granular. In woods and on hillsides, generally in rich soil, southern Maine and New Hampshire and eastern Massachusetts. Maine, North Berwick (J. C. Parlin, 1891; J. C. Parlin and M. L. Fernald, 1897); New Hampshire, Jaffrey and Dublin (B. L. Robinson and E. L. Rand, 1897); Massachusetts, Lexington (B. L. Robinson, J. M. Greenman, etc., 1897).

* Howell, *Pacific Coast Plants, Collection of 1887*, No. 1105; *Fl. North-western America*, 113.

† Trelease, *Gray Syn. Fl. N. Am.*, I., pt. 1., 408.

‡ *Pittonia*, II., 15.

not retain too much moisture in winter, and where the plants can be well covered with dry leaves, is the most suitable one. Another important point in cultivating *Alstromeria* is that it does not like to be disturbed too often, and therefore when once established it ought to be left alone.

sown will produce any number of young plants, and, in fact, this is the most natural and most satisfactory way of increasing the plants. My experience with the seeds is that they lie dormant one year before they germinate.

As usual, *Acanthus latifolius* is attracting much attention, as



Fig. 36.—*Rhamnus occidentalis*.—See page 284.

1. A flowering branch, natural size. 2. A fruiting branch, natural size. 3. Vertical section of a flower, enlarged. 4. A fruit laid open transversely. 5. A nutlet, enlarged.

The stems of this plant grow from three to four feet high, but they require no staking, as they are stout enough to take care of themselves. The umbels are made up of about a dozen large flowers, which are orange-red and streaked with red. An abundance of seeds are produced annually, which if

it is now in perfect flower. The plants are unusually thrifty, and there are three dozen well-developed flower-spikes now and many more which have not quite appeared above the foliage. This plant is not seen to the best advantage when grown in the mixed border. The best position is on the lawn

in an open space, where it should remain undisturbed for a number of years, and then it will compel admiration for its stately habit and foliage. This *Acanthus* is protected here in winter with a covering of leaves, but I have little doubt that well-established plants would thrive without any covering.

Spiræa palmata is an old Chinese plant, but one never tires of its large palmate leaves and its large clusters of rosy crimson flowers. It is slightly more than a yard high and its blossoms are carried high above the dark green foliage, which gives them a pleasing effect. *S. palmata* is probably the best herbaceous species belonging to this useful genus, and when well grown is always desirable. It does best here in a deep rich soil and slightly shaded position. It is easily increased by division either in the spring or fall.

Harvard Botanic Garden, Cambridge, Mass.

Robert Cameron.

Notes on Pelargoniums.

PELARGONIUMS as known in gardens are hybrids of *P. grandiflorum*, and commonly called Lady Washington Geraniums. When properly grown they are among the brightest decorative plants we have. They are in no way delicate in constitution, and, like their near relative, the common Geranium, are sure to bloom if sufficient light and sunshine are allowed them. Pelargoniums flower during the spring months, and in order to obtain fine, shapely specimens there must be a season of preparation. Following the conditions imposed by nature, it is well to rest them until midwinter, though not to the extent required by bulbous plants; they should be watered occasionally to keep the wood firm and the roots healthy.

To begin a new collection or replace old plants, cuttings should be put in now. They take longer to root than Geraniums, and must be kept growing from the time they are rooted. Where large numbers are required, as in commercial establishments, a good plan is to plant out the old plants. They will furnish an abundance of cuttings, and the cutting-bench can be kept going until the end of September. Cuttings rooted from now onward make neat plants in six-inch pots, such as are extensively grown for the flower markets of the large cities of Europe. They have had only a limited sale as Easter plants in this country. If, however, large specimens are desired, it is better to take out the flower-buds from the young plants next spring. This strengthens them, but they must be rested to some extent, as are the older plants.

Rested plants must be repotted not later than January, gently started, stopped frequently and tied into shape. The best specimens are those trained so that the foliage and flowers almost hide the pots from view. With a light airy position and a night temperature of fifty, the plants will make good sturdy growth. Pelargoniums have a special season of bloom, unlike Geraniums, which bloom when allowed, and flower on separate growth. They cannot be retarded by taking out the flowering-stems, and when they are ready they must be allowed to bloom.

A list of some of the newest and best includes Jubilee, light pink, very attractive; Kingston Beauty, white, dark standard; Ophelia, reddish purple; Multiflora, pink, dark standard; Nellie Hayes, white, dark standard; Duke of Fyfe, pink and white; Lady Duff, scarlet and pink; May Queen, deep red; Mrs. Wright, white, scarlet tinted; Duke of York, scarlet, pink and white.

Garden Geraniums, hybrids of *Pelargonium zonale*, are more widely known. When one gardener wishes to show his contempt for another's skill, he says "he can't even grow a Geranium," which is the same as saying there is no plant so easy to grow. Geraniums are divided into bedding and fancy varieties, or such as make better pot-plants. Those of the latter class are again divided into the large round-flowered single forms, the Bicolor or Corona type, and the semidouble Bruants. Of bedding varieties it is enough to say we box off cuttings in the autumn after the first frost. They are almost sure to root if not overwatered. They may be put away on shelves, and require little attention until spring.

To grow fancy varieties into specimens requires more attention. We take cuttings at this time and keep them growing. Some few may be allowed to bloom during the winter, but those required for specimen plants may be treated as recommended for Pelargoniums. They make first-rate plants toward spring, and florists grow them in large numbers for spring sales. All that is needed is to keep the flowers picked off until within a week or two of the time when it is desired to have them bloom. Large specimens are better for being rested a month or six weeks during midwinter in a good light position with a

temperature as low as forty-five. As the days lengthen with increased sunshine they may have more water, and manure occasionally. The new growth will be covered with bloom in from four to five weeks.

Single round-flowered Geraniums worthy of recommendation are Florence Farmer, white-veined and tinted with salmon; Eleanor, clear, bright orange; Olivia, bright rose; Snowdrop, pure white; Gertrude Pearson, clear pink; Dr. S. Grey, crimson; Corona, or aureole type; Madame G. Henry, shades of rose-white and red; Madame Bruant, white, veined with carmine; Renommée Lyonnaise, scarlet, white centre; Le Rhone, rosy scarlet, white centre and white blotches on upper petals; Bruants, semidouble; Madame Janlin, deep rose; Eulalie, light salmon, an attractive flower; Gloire de France, white, pink-tinted, and Beauté Poitevine, salmon-pink.

Wellesley, Mass.

T. D. Hatfield.

Greenhouse Notes.

MOST people are fond of Mignonette, especially when used with other cut flowers, and it is never at its best until cool weather or midwinter under glass. To have it early, or about Christmas, the seed should be sown at the end of this month on a bench in a house that will be cool in winter. A minimum temperature of forty-five degrees is well suited to produce good spikes, and this is about the average temperature of a Violet-house in cold weather. It is almost impossible to make the soil too rich for Mignonette, and it also does best in a deep bench with at least a foot of soil, or, better still, in what is known as a solid bed where the roots may be cool and moist. Of course, a good strain of seeds must be planted. The Machet is most generally used, but any of the selected strains are equally suitable. Care must be taken to give plenty of room when sowing. We usually sow in rows eighteen inches apart, and thin out the plants when they are of good size to six inches in the row. A close watch must be kept when the plants are young for the small green caterpillars of the white butterfly; they will speedily ruin all the seedlings if neglected for a few days, but Hellebore will help, and with hand-picking they may be kept down.

Antirrhinums are becoming popular as winter-flowering plants, and the keeping qualities of the flowers after they are cut are surprising. They make a good succession to Chrysanthemums in the benches, and will flower in early spring. To have plants suitable to set out in benches in November cuttings may be taken now from some plants whose flowers are of special colors, or seeds of the mixed varieties may be sown now to furnish plants that will not have flowered previous to planting indoors. Antirrhinums may also be grown in pots to flower, but, like most free-rooting plants, should have a bench if possible.

The newer kinds of single Violets promise to be most useful flowers. Princess de Galles is a superb flower of good round outline, very fragrant and vigorous in growth. There seems to be no tendency to disease in these new strains, at least I have detected none thus far. Luxonne is another new one that should be tried; it is not so fragrant as some others, but is the largest of all, and owing to the narrow petals it measures almost as much across as some Pansies. The color of both these Violets is a good deep blue, and there seems to be no limit to their length of stem. If grown for no other purpose they ought to be tried for furnishing leaves to go with the double varieties, as these are injured greatly from continual plucking of the foliage in winter-time.

Poinsettias are now starting freely, and as these plants repay good treatment it is well to repot them as soon as growth begins. They should be placed outdoors in full sunshine for the hot months, and with the first cold nights of autumn they should be taken indoors into a cool, airy house at first. If they are wanted for Thanksgiving a little more heat will be needed. The double variety is much later in flowering, and will last well into the new year. The soil should be made very rich at potting-time by the addition of bone or some other convenient fertilizer. It is unsafe to rely upon manure-water to bring them on later, as this is sure to result in the loss of much foliage, which spoils the appearance of the plants when in bloom.

To those who have not tried it before, I would advise pinching off the flower-stems of the main crop of Carnation-plants in the field late in the season—say, the middle of August. A few plants should be reserved to flower early and set in cold frames for flowers until the end of November. They will do just as well, or better, than those planted in the greenhouse for the time, and when they are past, those in the house will be coming in with a full crop that will last all winter long, and will make a good succession to Chrysanthemums and help to

fill up the inevitable gap that always seems so hard to get over. I have frequently lifted these from the frames to take the place of *Chrysanthemums* on benches, and they have done well, too, but this should not be necessary. One should calculate to have no flower-spikes showing on the plants at lifting time, and then the crop will come in as described. Very large plants are by no means best, and four plants should be used to cover a given space rather than three. Unless the soil is heavy, care should be taken in lifting to get all the roots up, even if not a particle of soil adheres to them. It is surprising how well the roots take hold of the soil prepared for them if they are free of old soil and carefully planted.

Freesias should soon be shaken out of the old soil if this has not already been done. They seem to ripen better if taken out and put in a dry airy place in paper bags. They are not liable to start unexpectedly either, as sometimes happens when left to summer in the old soil in an out-of-the-way corner. We also repot *Lachenalias* at the same time as *Freesias*, and they are stored in a similar way, as they are liable to begin to root if the least moisture reaches them when at rest. Both *Freesias* and *Lachenalias* ought to be sorted as to size at potting time if well-flowered pots are desired, the small ones being set aside and grown on separately to flowering strength.

A good time to put in a crop of *Hydrangea* cuttings is when the strong shoots that have not flowered this summer have reached their growth. They root freely if put in a cool shady place out-of-doors, and from these plants one may get a fine truss of flowers next spring. If they are planted out for a summer they will make fine stock to grow on for forcing the year after. No plants are more likely to become too large to handle properly than *Hydrangeas*, and it is often a problem how to store them in fall and start them in spring. But with the rooting of a fresh lot each year useful-sized plants may always be on hand and an abundance of flowers.

If *Canterbury Bells*, *Foxgloves*, *Hollyhocks* and other biennials are wanted for use next year, seeds should be sown now. The plants will not be as large as those from seeds sown in spring, but will be much more useful for this reason, and will winter over better where they have to be stored, as in New England. The first two will make useful plants for early flowering in pots, and it is necessary to grow *Hollyhocks* each year from seeds now that the disease makes such ravages among them.

South Lancaster, Mass.

E. O. Orpet.

Ipomœa pandurata.

SOME of the tuberous-rooted *Ipomœas* have been in bloom in the open border here for some time past. They make a very attractive display, and when compared with other summer-flowering exotic plants, in return for very little attention given them. Among the most interesting of these are two native species—*I. pandurata* and *I. Michauxii*. The latter comes from the southern states, and needs a thick covering of leaves or some such material over the crowns to help it withstand severe weather. Even then, if kept out, it is usually late in starting, and the summer is nearly gone before it comes into bloom. By allowing the shoots to get several feet long in the greenhouse before planting out, which they will do even when the tuber is not placed in soil, but merely allowed to lie under the staging, the season of blooming is hastened very much.

Ipomœa pandurata, known commonly as "Man of the Earth," owing to the immense fleshy roots of the full-grown plant, is a native of the eastern states, and is common from Connecticut to Georgia on sandy banks and neglected farmlands. As showing the size of the underground portion of the plant, some years ago I spent two hours with pick and spade in digging up an old plant. The root measured more than three and a half feet long, and at the thickest part ten inches in diameter. This plant has since produced hundreds of its showy flowers every summer, and is yearly covering more space. It is growing in a mixture of sand and vegetable humus, and every autumn it gets a good covering of manure, not as a protection, but to enrich the soil. There are at least two forms of *I. pandurata* found in a wild state; one has flowers about two and a half inches across, the other has flowers twice this size. The merits of this species must be judged from the way specimens grow in their native wilds. As we usually see them they have very few long straggling stems and comparatively few flowers expanded at one time. When brought under cultivation—that is, when full-grown specimens are transplanted—the plant throws out a great number of stems and flowers from the beginning of June till September. Under cultivation, however, the flowers are no larger than they

are in a wild state. The propagation of the plant from cuttings I have found to be by no means easy; in fact, it seems to be quite as difficult to root as the well-known tropical species, *I. Horsfalliæ*. The roots of medium-sized plants, when cut into pieces about three or four inches long, will occasionally sprout, but this is by no means a certain method, as they have been known to remain in an inactive condition for more than a year. Where old plants are growing wild in a well-drained soil they seed freely, and young plants are quickly raised from them. Seedlings, however, take a long time to make good flowering specimens. Any of the tender tuberous-rooted species, which are found to be difficult to root from cuttings, will be found to take readily when grafted on pieces of the root of *I. pandurata*. The operation should be performed in late summer, when the shoots are thoroughly ripened.

Botanic Garden, Washington, D. C.

G. W. Oliver.

Notes on Carnations.

PLANTS out-of-doors are looking extremely well this season. We have not yet had any prolonged drought, as is common in July and August, and young plants are all growing luxuriantly. The first ten days of July were exceptionally hot and dry, but by keeping the ground well stirred the plants did not seem to suffer in the least, and a copious rainfall on the 13th, with continued high temperature, started them into active growth. Success next winter depends largely on the treatment given the plants from now until lifting time in September. If the ground is allowed to bake and weeds to grow, only failure can be expected. Whether watering ought to be resorted to in dry weather is a debatable question. Many successful cultivators condemn it altogether, and personally I am not in favor of it unless it can be done thoroughly. In commercial establishments, where many thousands of plants are grown, watering would be expensive in many cases, and in others impossible, owing to deficient water supplies. On private places, where at most a few hundred plants are housed, artificial watering can be done quite readily if a good length of hose and a standing sprinkler are at hand, by having the sprinkler at work in one place for two or three hours, when a bed will be pretty thoroughly soaked. Many artificial aids to growth are needed in our climate, and I approve of watering when plants show signs of suffering rather than wait for a chance shower. Plants allowed to become dust-dry at the root and to droop helplessly will certainly not give as satisfactory returns as those kept growing steadily. After every watering and rainfall a thorough cultivating of the soil among the plants is necessary. Weeds grow apace at this season, and many of them will need rooting out by hand if they are close to the plants. Once a week we go over the rows and do any stopping required, holding the shoot with one hand and drawing out the top with the other. A mere nipping or clipping off of the tops is of no use whatever.

Summer-blooming *Carnation* plants are now flowering quite freely. The earliest and best sorts are *Daybreak*, *Mrs. Fisher* and some unnamed scarlet seedlings. A scattering of some chemical fertilizer, such as *Bowker's Hill and Drill Phosphate*, or sheep-manure, or a soaking of liquid manure after a heavy rainfall, is beneficial. Heavy rains dash the soil on the flowers if the plants are not kept well tied up, and we find a light mulching of spent mushroom-manure, or any old manure, helps to keep them clean and the ground moist. There is, as a rule, not much time for disbudding *Carnations* during the hot summer months, but if this can be done improved flowers and stiffer stems will be had. Our hot, dry summers and severe winters make it impossible to successfully grow the border *Carnations* which are the glory of English gardens at this season. But by a selection of suitable American kinds any garden may show a constant succession of bloom from early in July until sharp frost cuts down the plants. The *Rose* is undoubtedly the queen of flowers while in season, so far as out-door ones are concerned, but three weeks is about the term of the *Rose* season, and after that only an occasional bud is to be seen. It is not strange that *Carnations* are the flowers of the million, for their fragrance, freedom of bloom and lasting qualities all recommend them. Cut sweet peas or roses in an ordinary living-room last only about forty-eight hours, while a vase of *Carnations* will keep fresh for nearly a week.

Many growers throw out their *Carnation* plants from the benches before hot weather sets in. We generally keep ours in until September 1st, just allowing time to clean out the old materials and prepare for the winter stock. The benches should have a coat of limewash and be refilled and the new stock planted. Plants thus furnish flowers for nearly twelve

months. Our plants were given a mulching of cow manure in May and a soaking of some liquid stimulant once a week during the summer months, and a thorough hoeing early in the afternoon of every clear day to keep red spider in check. The most persistent bloomers are mainly well-tried varieties, such as Lizzie McGowan, William Scott, Thomas Cartledge, F. Mangold, Eldorado and Alaska. The most unsatisfactory sorts include Meteor, Bridesmaid, Helen Keller, Triumph, Crystal and Nicholson.

Attention should now be given to the compost-heap intended for use in the benches in September. Too often these heaps are a mass of rank weeds which take up a large part of the food intended for the Carnations. We always use some bone-dust in compost, and if this has not yet been added it should be mixed in now. Weeds should be kept out of the heap by all means, and a few minutes' work once a fortnight will suffice to accomplish this.

Taunton, Mass.

W. N. Craig.

For Winter Flowers.—Among border plants useful for furnishing cut flowers in winter may be mentioned Snapdragons. We have selected varieties propagated from cuttings, and some strains come tolerably true from seed. In a white-flowered collection was one with the delightful odor of orange blossoms. *Coreopsis Drummondii* is another useful plant and furnishes enormous quantities of flowers. The seeds should be sown now to secure good plants for autumn-blooming. *Anthemis tinctoria* will replace yellow Marguerites, and this also makes neat little pot plants which flower nicely in five-inch pots.

Wellesley, Mass.

T. D. H.

Correspondence.

The Sycamore Blight.

To the Editor of GARDEN AND FOREST:

Sir,—I never chanced to observe the Sycamore blight on an Oriental Plane-tree, and we have always had the impression that it was free from the disease, or, at least, so rarely attacked that we have never hesitated to recommend its use. The disease is so virulent this year that I should be glad to have reports from your readers who observe Oriental Plane-trees. I have noticed that on our native Sycamores the young trees are not generally affected, and I am curious to know the reason of their immunity. The blight is very common in the New England states, and, as far as my observation goes, it becomes less frequent as one goes south. In former years I have looked in vain in North Carolina for a tree which shows the characteristic bunchy growth of twigs caused by the disease. If the fungus is not limited by climatic conditions our Sycamore is a doomed tree for landscape purposes in all parts of our country.

Brookline, Mass.

F. L. Olmsted, Jr.

[Professor W. R. Lazenby writes in the current issue of *The Country Gentleman* from Nashville, where he has been attending the Exposition, that the blighting of the leaves of our native Sycamore is such a universal occurrence this year wherever he has traveled, that an uninfected Sycamore-tree is a rarity. Professor B. T. Galloway, chief of the Division of Vegetable Pathology in the Department of Agriculture, writes that *Platanus orientalis* is affected by the blight in Washington as well as the native species, although not as severely, and he adds that neither of the trees is as badly diseased in that city as they have been in former years. Dr. Halsted says that, while he has never observed this anthracnose upon the Oriental Sycamore, this tree is known to be a host of the fungus, and the blight was first described in Europe upon *Platanus orientalis*. The same *Glæosporium* also occurs on *P. racemosa* in California.—Ed.]

Notes on Hardy Plants.

To the Editor of GARDEN AND FOREST:

Sir,—The beautiful *Campanula persicifolia* has developed an interesting peculiarity which I have not seen recorded and which I have not noticed in any other herbaceous perennial. It is always my custom to cut away the flowering stems of herbaceous perennials when through blooming. In this instance, however, they were left on to obtain seed. The old flowers are now dried up and seed-pods have formed, yet between each of the former flowers new buds are forming and open-

ing on the old stems all the way from bottom to top. It remains to be seen how many times this process will be repeated during the season.

Cimicifuga racemosa is a desirable subject for the garden in a moist spot where it will get the morning sun. The shape of the plant is very graceful, and the long, twisted panicles of fine white flowers at the top of the long branches are extremely decorative. The fragrance is almost oppressive and the bees swarm among the flowers.

Pentstemon barbatus Torreyi is seldom seen in gardens, but is remarkably handsome when well grown. This season has been especially favorable to its needs, and the stems have been from three to four feet long, covered from tip to about a foot from the ground with showy vermilion drooping flowers. It stands the winter well and increases in size.

Bergen Point, N. J.

L. C. L. Jordan.

Flowery Byways.

To the Editor of GARDEN AND FOREST:

Sir,—Our native trees, shrubs and vines about St. Louis and in southern central Illinois have flowered with unusual profusion this year. First, the wood borders in all the ravines and bluffs on the Illinois side of the Mississippi blushed with the opening flowers of the Red-bud trees, and on the Missouri side the wild native growth on the tongue of lowland between the big rivers for miles above their confluence was rosy with the blossoms of the same trees. Following these were Dogwoods, Wild Plums, Cherries and Crab Apples, and later on every woodland way was powdered with the stars of Wild Blackberry blossoms, and the air was fragrant with the flowers of the Wild Grape from vines that were clambering over the trees. After these came in lavish abundance the blossoms of *Cornus paniculata*, with mounds of Wild Roses piled over the fences or over each other, and just now the course of every stream is outlined and every fence corner is decorated with the immense cymes of creamy Elder blossoms, the commonest and yet one of the most beautiful of our native shrubs, while along the railroad rights of way the posts of the barbed-wire fences stand like many-branched candelabra supporting the flaming flowers of the Trumpet Creeper.

Brighton, Ill.

Fanny Copley Seavey.

The Cost of City Parks.

To the Editor of GARDEN AND FOREST:

Sir,—Your editorial, entitled "One Way to Reduce the Cost of Park Maintenance," suggests the thought that in many great industrial centres park accommodation is entirely inadequate. We have one great park on Manhattan Island and a number of smaller parks, but our congested population needs many more open spaces in which the free sunlight and the breath of nature can have full sway, and we must have them before this city assumes its proper place in the march of progress.

One great difficulty in the way of establishing parks in great centres of population is the opposition of landowners. Of course, in condemnation proceedings, the ousted owners naturally interpose objections, even if to be paid the full value of the condemned property; but such objections generally indicate a disposition to drive a hard bargain with the community, and need scarcely be regarded seriously.

With respect to other owners, if it can be shown that taxpayers not only do not suffer loss, but that the outlays necessary for park extension are borne in the majority of cases by the rent-paying public, little opposition might be expected to the extension on a large scale of a class of improvement that peculiarly reflects advancing modern civilization.

As a matter of fact, proven by the history of all such improvements, the cost of opening and maintaining parks, where sites have been judiciously selected, is in the nature of an investment from which large returns can be confidently expected. While the shortsighted policy of some property owners will always stand in the way, the opposition from this source can be reduced to a minimum by the educational influence of periodicals like GARDEN AND FOREST. A public-spirited press can do much to advance the public interests when threatened by the fatuous opposition of people blind to their own.

Much of the opposition has arisen from the unscientific methods of assessing the cost of parks, the usual plan being to charge one-half against the immediately abutting properties and the balance on other taxpayers through general taxation. This plan, which arbitrarily allocates a great part of the expense without taking into account all the property benefited,

necessarily works injustice, and those owners likely to suffer loss will make a more vigorous fight against improvement than its friends will in its favor. For instance, it can be readily seen that while residential properties adjoining a new park might increase in rent-yielding value to the full measure of their assessments, properties devoted to business could derive no advantage. On the contrary, because of the increased capital charge, business in the improved locality would have to be conducted on a less profitable basis or move away. Cases of hardship cannot be altogether avoided under any scheme of municipal improvement, but substantial justice can be done under a fair system of assessment. Park improvements will radiate value over a much greater area than the immediately adjoining properties. For example, Central Park undoubtedly diffuses a value throughout the whole of Manhattan Island, though, of course, in greater degree as the properties affected lie in its near vicinity.

Assuming, therefore, that park property is a paying investment, it remains to be seen what class of property ought to bear the cost. In this connection it may be pointed out that real estate reaps the whole benefit in a financial way, but, it may be observed, improvements on real estate do not reap a corresponding benefit, although these serve as a vehicle to convey the accruing increase in value to the owners in the tangible form of rent. Nothing of the kind can increase the value of improvements beyond the cost of duplication.

It would seem to follow, therefore, that the scientific method of charging the cost of parks is by a general tax on values of real estate, without respect to the improvements thereon. Such a method would obviate the greatest difficulties attending the opening of new parks, and, because distributed among all the taxpayers in the exact ratio of benefits received, would provide for their maintenance on a liberal scale without unnecessary friction.

New York.

Arthur Ogden Glees.

Recent Publications.

Another part of the *Synoptical Flora of North America*, being vol. i., part i., fascicle ii., embracing the orders of Polypetalæ from Caryophyllaceæ to Polygalaceæ, has recently appeared, having been issued on June 10th last. The first part of this work, upon which Asa Gray labored assiduously for many years, appeared in 1878, being devoted to the Gamopetalæ after Compositæ. In 1884 Professor Gray produced another part, including Caprifoliaceæ to Compositæ inclusive, the elaboration of the last family being his most important contribution to descriptive botany. After his death the work was taken up by his successor, Mr. Sereno Watson, who died, however, without adding to it. In October, 1895, Dr. B. L. Robinson, curator of the Gray Herbarium, issued vol. i., part i., fascicle i., including the families beginning with the Ranunculaceæ and ending at Frankeniaceæ, and he now issues another part which is a substantial addition to this important work.

The great Pink family, occupying nearly fifty pages, has been elaborated by Dr. Robinson himself, who also contributes monographs on the Ficoideæ, and has also arranged and extended Dr. Gray's preliminary studies on Portulacaceæ, Elatinaceæ, Malvaceæ, Tilliaceæ, Zygophyllaceæ, Rutaceæ, Burseraceæ, Anacardiaceæ, Cyrillaceæ, Olacineæ. The account of the Sapindaceæ and Polygalaceæ is also from Dr. Robinson's pen, while Professor Trelease describes the Linaceæ, Geraniaceæ, Celastraceæ and Rhamnaceæ, Professor Bailey the Vitaceæ, and Professor Coulter the Hypericaceæ.

The form of the work is similar to that adopted by Professor Gray, and the nomenclature and arrangement of the families and genera are as they were when he died. This part contains, we believe, the last of Professor Gray's manuscript, so that the succeeding parts will be entirely the work of his successors. It is most desirable that they appear as rapidly as possible, for a complete Flora of North America is sadly needed everywhere by the students of botany.

We notice that especial attention is now given in this work to the correct citation of bibliographical references and figures, although the plates of different species of *Hypericum* which have appeared from time to time in the columns of this journal have been overlooked, while in

other families, as far as we have observed, the figures of GARDEN AND FOREST have been cited. As must invariably happen where work of this sort is done by different authors, there is a certain unevenness of treatment, although Dr. Robinson's careful editing has largely remedied this inconvenience.

It is not our purpose here to criticise the system of nomenclature adopted in the *Flora of North America* or to discuss questions of the limitation of species, but simply to call attention to the appearance of this important contribution to the knowledge of American plants and to congratulate the editor and his associates upon the completion of a thoroughly conscientious, conservative and able piece of work, which we hope soon to see followed by the concluding parts of this work, the best and greatest monument of Asa Gray.

No. 2 of vol. v. of the *Contributions to the United States National Herbarium* is devoted to a most interesting account of the plants used by the Klamath Indians of Oregon, by Dr. Frederick V. Coville, the principal botanist of the Department of Agriculture. Nearly all the trees of the region were used by the Indians in one form or another. The bark of the White Fir, *Abies concolor*, to dye and tan their buckskin; the wood of *Juniperus occidentalis* for boys' bows; the wood of *Libocedrus*, which is rare in the region west of the Cascade summits, in former times for fire blocks and occasionally in basket-making, the branches and twigs of this tree being frequently employed in administering sweat baths to the sick. The seeds of the Sugar Pine were used for food, while from the Lodge Pole Pine, *Pinus contorta*, var. *Murrayana*, sections of the bark are cut for baskets for gathering berries, particularly huckleberries, which, placed in such receptacles and covered with leaves, retain their freshness for a long time. The pitch from this tree is used as a remedy for sore eyes, a small fragment being placed inside the lid. The young stems, stripped of their bark, are used to push dug-outs through shallow water. The cambium layer was scraped off and eaten in time of famine just as the bark of the Yellow Pine was used, a fact which was noticed long ago by Dr. Lyall, the naturalist of the Oregon Boundary Commission.

The chief timber used by the Klamaths is derived from the Yellow Pine, *Pinus ponderosa*, the common tree in all the region east of the Cascades. Their dug-outs are made from single logs of this tree hollowed out by fire, and its twigs were used as kindling-sticks in producing fire by friction. From the Yew, *Taxus brevifolia*, which is pretty widely distributed over all the mountain ranges of the north-west, was derived the favorite bow wood of all the Indian tribes of that part of the country. Hats were made from the bark of *Populus tremuloides*, and cloth from that of *Populus balsamifera*. The frames of the Indian snowshoes are commonly made from Willow wood, and the young shoots of the different Willows which abound in the region are used as material for packing-baskets. The bark of the Alder, *Alnus tenuifolia*, boiled in water, formerly served as a dye.

It is curious to note that the Indians who were forced to eat the roots, fruit and seeds of almost every plant, made no use of the berries of *Berberis repens*, which certainly are less disagreeable to the taste than many of the things they seemed to relish. *Philadelphus Lewisii*, the common *Syringa* of the north-west, it appears, has obtained the name of arrow-wood because the Indians used the stems in the manufacture of large arrows for war purposes or the killing of big game.

This is one of the most important and interesting contributions to economic botany which has appeared for a long time, and it will be followed, we trust, by similar studies of the plants of other regions.

Notes.

A correspondent of an English paper speaks of the La Mance Iris as the best garden Iris among the North American species. The flowers are large and of a singularly rich color, the

light green styles being a noticeable feature which is considered to add to the beauty of the plant as well as to its distinctness.

A Wellesley, Massachusetts, correspondent writes with enthusiasm of a specimen of *Brassia verrucosa* in the collection of Mrs. Durant. It has twenty well-formed spikes.

The strawberry crop in Kent, England, this year has been quite phenomenal, according to the *Westminster Gazette*. In one day thirty tons were sent from Sandwich alone.

At the late National Rose Show in England the first prize for a dozen trusses of hybrid Tea Roses in not fewer than nine varieties was taken by Messrs. D. Prior & Son, who exhibited *Marquise de Litta*, *Caroline Testout*, *Kaiserin A. Victoria*, *La France*, *Captain Christy*, *Mrs. W. J. Grant*, *White Lady*, *Lady Mary Fitzwilliam*, *La Fraicheur* and *Auguste Guinoisseau*.

During the last six years the number of public parks in Glasgow have been more than doubled. And although it has been complained hitherto that the corporation has favored the well-to-do west end and neglected the industrial east end in regard to open spaces, it has now purchased for \$150,000 one of the most picturesque spots in the neighborhood of Glasgow, just on the eastern boundary of the city.

The hybrid between *Rosa multiflora* and General Jacqueminot, which has been named the Dawson Rose, after its originator, is spoken of very highly by English connoisseurs, and, according to *The Garden*, it is one of the very earliest Roses to bloom there out-of-doors. This year it was in good flower on the 28th of May. It seems to have retained its free-flowering habit across the sea, where it has proved one of the most floriferous and showy of pillar Roses.

Among the curious wares for sale on the push-carts of the east side of this city are Cassia-pods, which come from northern Africa. These pods are the fruit of *Cassia Fistula*, the Pudding Pipe tree, a native of India. The pods are from one to two feet long, cylindrical, dark brown, with a woody covering and divided into compartments, each containing a flat seed surrounded by a dark pulp, which is the edible portion. This pulp is sweetish and is said to have laxative qualities.

The *Kœlreuteria*-tree has been known in European gardens for more than a century, and it is not rare in the parks and gardens of this country. Like many eastern Asia trees, it is occasionally disfigured by that mysterious "die-back" which shows itself in the death of single branches without any apparent cause. Owing, perhaps, to the abundance of moisture this year, the pinnate foliage has been unusually abundant, appearing in airy and almost Fern-like masses. Just now the trees about here are coming into flower, and the large terminal, spreading clusters of clear yellow flowers at this season, when no other trees are in bloom, make the *Kœlreuteria* a conspicuous object. These flowers are succeeded by bladderly fruits, which are also interesting.

Rosa setigera, the beautiful native climbing Rose, has just passed out of bloom, and although its merits are beginning to be appreciated, we never feel that we can say too much in its favor. In the very first volume of this journal we spoke of the freshness of its broad, clean, healthy leaves and of the conspicuous beauty of its great corymbs of large, deep rose-colored flowers. But there was little demand for single Roses, especially of the native kinds, and it is only within recent years that nurserymen have kept it for sale. It is perfectly hardy and will make strong shoots fifteen feet long in a year, which may be either trained to some support or left to arch over on the turf or trail down a bank. When a stem is cut the flowers keep opening in succession, so that they last a long time. In the autumn its stems turn to a dark purple and the leaves to a brilliant orange and scarlet. In the Arnold Arboretum and in the Boston parks generally, where the *Prairie Rose* has been largely planted, it has been better than ever this year, and many good judges are inclined to class it in the very foremost rank among useful shrubs.

President T. S. Gold, of the Connecticut Board of Agriculture, writes to *The American Agriculturist* that an experience with more than one hundred varieties of grafted Apple-trees convinces him that the stock has no influence on the taste of the fruit. That is, if a very sweet apple is grafted on an exceedingly sour stock the sweetness of the resulting fruit is not reduced. The acidity and other qualities of apples are largely affected, however, by the health of the tree and its location, some varieties varying much more than others. For example, the Northern Spy and the Yellow Bellflower vary from the best to the most worthless fruit. On one tree apples may be tender, juicy and of a pleasant acid flavor, on another they are

tough, corky and acid, without any suggestion of sweetness. When a tree has been long in grass, producing sour and worthless apples, a cartload of strawy manure spread about the trunk opens the turf, starts the growth of the tree and gives to the fruit the richest flavor. Spraying with Bordeaux mixture, which protects the foliage from disease, has the same good effect on the fruit.

In a long letter to *The Rural New-Yorker*, a correspondent from the Mississippi Valley gives some interesting stories of the manner of life in that region during the time of the great deluge. Some people, who had already made their gardens before the flood came, took the precaution, as the rising water became more threatening, to nail a plank around the sides of the back galleries of their houses and covered the floor with several inches of earth. The vegetables were then lifted from the garden and planted in this soil, and in this way most of the growing plants were saved until the water soaked into the ground and the plants could be set back in their places. These persons were able to show thrifty vegetables a few days after the water had disappeared when their neighbors were getting ready to sow their seed again. It was the orchards, however, which suffered most. Several weeks of standing water will kill most trees, and the Peach-trees were the first to wilt and die. About the only fruit-trees which seem able to endure three or four weeks with their roots in water are the hardy varieties of the Plum, and for this reason it is recommended that hereafter Peaches in districts liable to be flooded shall be grafted on Plum stock.

Although the season for berries is waning, all the kinds are still represented in our markets, as strawberries, red, white and black raspberries, wild blackberries from Delaware and Maryland, and Wilson, Kittatinny and other popular cultivated kinds, huckleberries from the Shawangunk and Pocono mountains and other near-by sections, large luscious red currants, immense English gooseberries, ripe, and intended to be eaten out of hand. Besides the supplies from Delaware, Maryland, New Jersey and Pennsylvania, trains of refrigerator cars arrive here daily from the berry-growing section of New York state, about Oswego, Rome, etc. From the *Fruit Trade Journal* it is learned that these trains consist of sixteen to twenty-two cars, and each contains about two hundred crates. The cars are on the way only from ten to fifteen hours, so that the berries come through in first-class condition. All these state berries are received at the freight depot which stands upon the site of the old St. John's Park, and every morning during the season that locality is crowded with wagons and trucks which convey the consigned fruit to small dealers, commission houses, hotels and steamboat companies. The height of the season for these fruits was reached on June 25th, 26th and 27th. For the week ending July 6th ninety-eight carloads of berries, or nearly 20,000 crates, came from the Oswego district alone. The berry crop in western New York has been unusually good this year, so that with favorable rates fixed by the railroad companies, the season has been a profitable one to the growers. Wild Goose plums and cherries, from near-by states, are fairly abundant, and Moore's Early grapes, from South Carolina, are seen. Le Conte pears come from the south, and besides new apples from Delaware, Maryland and Virginia, there are early varieties from the orchards of this state and New Jersey. Sound hand-picked apples sell for \$3.50 a barrel. Altogether, 115 carloads of watermelons were received here last week by rail and steamer, from South Carolina and southward. The best grades are entrusted to rapid carriage by rail. The spicy Jenny Lind and Gem and the red-fleshed Christina melons come from the Carolinas and Virginia, but many shipments are of inferior quality, and choice muskmelons are scarce. The quality of Georgia peaches continues unsatisfactory, as much of this fruit is stung and has been bruised in falling, and the sound hand-picked fruit has too often beengathered green. Among the best kinds now coming from Georgia are Elbertas; from South Carolina, Mountain Rose, and from North Carolina, Tillotson. A few early peaches are already received from Maryland and Delaware, but these hardly suggest the mature fruit which will be seen a few weeks hence. But a short note cannot include more than mention of some of the fruits bought and sold in any large American city at this time of year, for, besides the near-at-hand products already named as reaching this city last week, there were some 80,000 bunches of bananas, 50,000 cocoanuts in one cargo alone, nearly 500 barrels of pineapples from Cuba and several thousand crates of the same fruit from Florida, nearly 75,000 boxes of Mediterranean lemons, besides sixty-three carloads of pears, plums, peaches, apples and apricots from California.

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The Administration of the Forest Reserves.

THE Hon. Binger Hermann, Commissioner of the General Land Office of the Department of the Interior, has lately issued a circular of rules and regulations for the government of the forest reserves. These rules are approved by Secretary Bliss, and they are promulgated in accordance with the amendment to the Sundry Civil Bill, which was approved June 4th, and which authorizes the Secretary to establish such a service and to prescribe such rules as will insure the objects for which the reservations are created.

Many of these rules are in a line with the scheme of administration advised by the Committee of the Academy of Sciences, while others directly contravene the principles there laid down. At the outset, however, it may as well be said that the character of the rules published by the Secretary is not a matter of serious practical moment. He has not the machinery nor the money to enforce them. Many of his predecessors have been earnest in their desire to check timber depredations on the public lands, to mitigate the dangers to the forest from fire, and to protect the mountain slopes from the pasturage of hoofed animals which destroy the forests wherever they tread. Like his predecessors, Mr. Bliss will be compelled to rely upon employees appointed for political reasons, and many of them in full sympathy with herders and speculators and prospectors and timber thieves who have had their way unchecked ever since they drifted into the west. Indeed, these men have always been allowed to use the forests as if they owned them in fee simple, and they naturally resent any attempt to restrain them by federal interference as an infringement upon their rights—rights which they feel that they have acquired by long usage, even if they do not rest on definite statutes. There have always been rules and regulations enough to protect the property of the United States, but, of course, the rules are not able to enforce themselves, and naturally no great energy has been expended in their enforcement when this work has been entrusted to political appointees, often selected from the districts which they are to oversee. It is true that cases are brought to trial, but no one expects local courts

and juries to take the matter seriously, so that attempts to enforce the laws have been farcical. Rules have not yet been able to prevent individuals or corporations from cutting timber wherever they choose on some pretext or other, or from selling it in a distant market, whenever this could be made profitable. They have not prevented sheep from following each other up steep mountain slopes in long procession and trampling out ditches to facilitate the gathering of floods to lay waste the plains below. They have not prevented flocks and herds from gnawing every green thing to the ground—grass, herb, shrub and seedling trees—so that the snows will melt more quickly. They have not prevented herders from burning over league after league of mountain slopes to furnish fresh herbage for their flocks in spring and insure the desolation of the lowlands by floods, and the filling up of agricultural intervals with debris from the mountains.

It may be said here that a portion of the forest property owned by the nation has been to a certain extent exempt from these ravages. Nothing can arrest a forest fire when it has gathered full force and is sweeping through the dry and resinous woods of the distant west. But there is such a thing as preventing fires and checking them at the outset. Ever since the Yellowstone National Park has been patrolled by a troop of United States cavalry that vast territory has suffered comparatively little in this respect. There are three national parks in California, and while the surrounding forests have been imperiled by sheep-herders, a small detachment of United States troops have sufficed to avert the danger. These object-lessons and similar ones in Canada and other countries so plainly indicate the proper way to preserve our forests from its worst enemies that we can only express regret that the first bill recommended by the National Forestry Committee has not already been passed at the extra session of Congress. This bill provided that the Secretary of War should be directed, upon the request of the Secretary of the Interior, to detail troops to protect the forests, timber and undergrowth on the public reservations and on the national parks until a permanent forest bureau has been authorized and organized.

It is no fault of the Secretary of the Interior that he cannot call upon the army with the assurance of any assistance under existing laws. It is no fault of his that the construction of roads in the reservations is authorized, although with the force and information at his command this will mean that any one who wants a road will get it where he likes, and every time one of these roads is built it means new danger from fire over a large territory. The Secretary must make regulations for the location of mines and the procuring of timber for certain uses; but without any force at his command to compel obedience to his restrictions, this means that anybody can procure timber and locate mines and do generally what he likes. Section 13, however, seems to us distinctly a step backward. If we understand it, the pasturing of cattle is permitted in all reservations, and sheep are allowed to range in the states of Oregon and Washington, although they are shut out from other reservations. This exception is made in favor of the extreme north-western states because "the continuous moisture and abundant rainfall of the Cascade and Pacific coast ranges make rapid renewal of herbage and undergrowth possible." Now, the fact is that the eastern slopes of the Cascade range, and all the ranges of eastern Washington and Oregon, are arid, and these are the places where sheep are most abundantly herded. On the other hand, where the undergrowth is luxurious, there is an additional temptation for the shepherds to fire it in order to get it out of the way. This regulation is made against the experience of all other countries where domestic animals have ever been allowed to browse in the forests, and it is contrary to the expressed judgment of the National Academy, which is the scientific adviser of the Government and the body authorized to give counsel in such cases. The situation is this: One Secretary of the Interior asked advice of the National Academy, and the National Academy distinctly

states that sheep-herding should be forbidden in all the national forests. In the face of this the Administration permits it in two states, and thus takes the responsibility of endangering the interests of large communities. Nobody knows what sort of pressure has been brought by these two states to exempt them from restrictions imposed upon other reservations, but certainly the pasturage of these great ranges, although it may help to enrich a few individuals, is against the highest welfare of the people of the United States, who own these lands and the forests on them.

The Douglas Spruce.

THE illustration on page 295 of this issue gives a far better idea of the dimensions attained by this tree than any mere enumeration of diameter measurements. In the region adjacent to Puget Sound, where the logs represented in our illustration were cut, the Douglas Spruce, *Pseudotsuga taxifolia*, grows to its largest size, often attaining a diameter of ten feet above the swell at the base of the trunk. Trunks twelve feet in diameter are reported, but if they exist they are very rare, trees with stems five or six feet in diameter representing an average good forest growth. The maximum height which this tree attains is still doubtful, and we shall be glad of any facts regarding it. It is probable that some specimens near Puget Sound have grown three hundred feet high, and there are stories, still needing confirmation, of individuals four and even five hundred feet in height. So far as we know, however, the tallest North American tree of which there are reliable measurements is the Redwood, measured last year on Eel River, California, by Professor Sargent, General Abbot and Mr. John Muir (see vol. x., p. 42), which was three hundred and forty feet in height.

The Effects of Wind on Trees.

THE great tornado of May 27th, 1896, gave an opportunity rarely offered for observing the effects of a strong wind on different trees. Professor J. B. S. Norton, botanical assistant in the Missouri Botanic Garden, took abundant notes at the time and has watched the trees during the past winter and marked their growth this spring. The results of these observations were embodied in an interesting paper read before the St. Louis Academy of Science, the chief portions of which we take pleasure in presenting to our readers through the kindness of Professor Norton:

The general effects of wind on trees play no very important part in the economy of nature. The action of varying winds on trees calls forth the efforts of the trees to strengthen the wood in every direction, so that trees growing in exposed situations are stronger and consequently make better lumber. The only thing to keep wind-forests from being overthrown where the trees are crowded together is the protection afforded by the more sturdy ones on the border. In localities where there is a prevailing wind the trees lean in the opposite direction, as is noticeable along the seacoast, where they seem to grow away from the water. Mr. Eigen, in *Zoe*, April, 1892, says that, besides causing the phenomenon just mentioned, the wind plays a prominent part in determining the shape of the tree. Most trees in wind-swept places have horizontal crowns. Some of these may grow more erect when transplanted to other situations. One species of *Baccharis* on the coast of California, with a spreading top, changes its shape so much when grown in the mountain regions away from the wind that the mountain form has been described as a different species. Other species that have grown for ages in windy situations may have the horizontal shape so fixed that it is retained wherever they may be grown.

In looking over the trees about St. Louis most of my observations have been confined to the western part of the city near the Missouri Botanical Garden and Tower Grove Park, where the damage was done by a straight wind from a westerly direction. This is shown even now by the fact that most of the branches removed were from the west side of the trees, where they were bent more by the wind, those on the opposite side being under but little transverse strain. A great

many trees that were partially uprooted are still inclined more or less toward the east. A few trees that were strained beyond the limit of the elasticity of their trunks, and yet did not break, still retain the curve away from the wind. This can be seen in a few *Taxodiums* in the garden and in many Elms about the city, perhaps in other trees. In Lafayette Park, where the genuine tornado did its work, the conditions are quite different and the destruction much greater, but many things besides wind must be taken into account as causes of the effects observed. Soil conditions have much to do with the uprooting of trees, as also does the root-form. Trees like the Spruce, with spreading roots near the surface, will be much more easily uprooted than those with tap-roots. If the root system and the soil which surrounds it is able to stand more strain than the parts of the tree above ground a break in the trunk or branches will result. The breaking depends on the strength of the wood, the amount of surface exposed to the wind by branches and foliage, and to a great measure on the shape and position of the tree and the method of branching. Conical trees like the Sweet Gums, European Elms and most of the conifers would have less strain on the roots and trunk than those of the opposite shape like American Elms, and Maples. The latter have the most of the wind-exposed surface toward the top where the wind is stronger, and the additional force and weight so far from the base gives a greater leverage on the roots and trunk. So we should expect more of the spreading-topped trees to be broken or uprooted, and such is the fact. But the breaking or splitting of so many trees of this form is to be attributed more to their method of branching. Trees with excurrent trunks and small lateral branches are not nearly as apt to be broken as those with a number of large ascending branches. Trees of great elasticity would be injured less than those not so elastic. The Silver Maples suffered as they did probably on account of their brittle wood, not being able to give before the wind without breaking, like some more elastic woods.

The damage would have been much less had the tornado made its appearance when the trees were leafless. Taking all the wind storms together, the coniferous trees are probably injured more than others for the reason that they always have a heavy load of leaves and because most of the wind storms come when the deciduous trees are leafless. The leaves offer a much greater surface for the wind to play upon, and especially do wet leaves, as has been pointed out by Mr. Kerr in the Proceedings of the Staten Island Natural Science Association for March, 1895. Where the leaves are not matted together by the water in rain storms, as they probably were in the St. Louis tornado, and thus offer more weight and resisting surface to the wind, it is interesting to notice what a small surface they present. The petioles are flexible in many trees, like the Maples, and especially the Poplars, and in the wind they allow the leaf-blade to assume a position parallel to the direction of the wind, thus presenting to it only the edge. The Silver Maple probably suffered more from the storm last May than any other trees. Scarcely a tree touched by the storm is left unbroken, and most of them have lost the principal branches or even the whole crown. The trees are well rooted, and the brittle wood, with its mass of foliage, is easily snapped off. *Ulmus Americana* suffered principally because the heavy spreading top with its slender branches is in such a position that they were easily split off. The irregular growth of the fibres makes the wood very tough, though it is only moderately strong. Where no weakness in the structure of the trees exposed them to injury, this species has withstood the storm remarkably well. In Lafayette Park, where everything else was almost totally destroyed, some Elms, full of branches, remain standing, though in many cases the branches are bent out of their original position. Trees of *Liriodendron Tulipifera*, in consequence of their weak brittle wood, were broken off through the main trunk. The Basswood suffered in about the same way. The Osage Orange of our hedges has very strong, tough wood, but the results of the storm show that it is easily split and uprooted. The large leaves, as well as a poor root system, allowed many Catalpas to be uprooted. The wood is not strong, but the number of branches partly twisted off shows that it is not so easily broken as some stronger woods.

The Oaks are among the strongest woods, and were scarcely injured. Most of the Oaks are as well able to withstand wind storms as any trees we have. The trunk is excurrent and the gnarly lateral branches are very thick and strong. The trees are also very well rooted. Many trees of *Populus monilifera* are still standing about the city, though this tree has weak wood and grows so rapidly that it is little protected by other trees. *Ulmus campestris* and *Liquidambar styraciflua* were little injured. Their salvation was in their form, a strong

excurrent growth with small horizontal branches and most of the wind-exposed surface toward the base. The latter tree has rather brittle wood, which breaks under comparatively little transverse strain. *Gleditsia triacanthos*, with its wide-spreading top and slender branches, we should expect to find much injured, but even isolated trees have stood well. The wood is strong, tough and elastic, and the finely divided leaves are not sufficiently abundant to offer much resistance to winds. Among those trees that escaped almost uninjured is *Taxodium distichum*, the Bald Cypress. The tall pyramidal shape which this tree takes in cultivation in our parks, so different from the wide-spreading tree of the southern swamps, offers very little resistance to the wind. The strong, elastic, almost whip-like trunks simply swayed back and forth in the gale without breaking or uprooting. Other conifers like the heavier Pines were uprooted.

A Chrysanthemum Disease.

LAST season the attention of this Department was called to a peculiar disease of Chrysanthemums in this section, which was confined wholly to the variety Philadelphia. Mr. Robert Miller, of Messrs. Strauss & Co., first noticed the trouble which had appeared on his plants while he was absent for a week. Although other varieties were in the same house with the Philadelphia and on the same bench, they showed no evidence whatever of the disease. The affected plants had numerous yellow spots or blotches on the leaves. The spots were irregular in size and shape



Fig. 37.—Sun-print of a diseased leaf of Chrysanthemum Philadelphia.

and stood out in striking contrast to the green portions of the leaf, especially if the latter was held between the eye and the light. In the case of Mr. Miller's plants, the leaves formed during his absence were most seriously affected, while those which had developed after he had taken personal charge were in most cases free from the trouble. In many instances a minute puncture was found near the centre of the spots. From this and other facts it seems probable that the disease is due to some inherent characteristic of the variety, by virtue of which it reacts quickly

to any injury either in the shape of insect bites or punctures, improper watering or feeding, etc. The variety, in other words, is constitutionally weak and needs only a very slight disturbance to cause a local breaking down of the cell contents, followed by the effects already noted. Several insects were present on the plants, notably leaf-hoppers, aphides (green and black), and a species of thrips. These insects were present, however, to a limited extent everywhere in the houses, and the marks of their bites and punctures were seen, unaccompanied by any further injuries except in the case of the variety named. Figure 37 is an illustration from a sun-print of a diseased leaf. The dark spots in the picture show the position of the yellow discolorations. It would be interesting to know if this disease attacks the same variety elsewhere.

It may be well to call attention here to the fact that there are many cases of yellow spotting of the leaves of greenhouse plants which can in most cases be traced to an improper use of water in its application to the soil and to a neglect of the right conditions of temperature, humidity, etc., in the houses. It is unnecessary to go into all the details of the changes in the vital functions of the plant which may take place under such conditions. Suffice it to say that as the tissues become waterlogged, groups of cells being thus disabled from manufacturing food, use up what they already contain, and when this trouble reaches a certain point yellowing and other changes follow. When a plant gets into this abnormal condition the bite or puncture of an insect will often hasten the changes, which eventually result in the formation of yellow, brown and various colored spots. Certain fungi, too, find these more or less disorganized areas excellent feeding ground, so that they come in and complete the work. Too often only the insect or fungus is seen and considered, the fact being overlooked that they are only links in a chain, as it were, and oftentimes not very important ones at that. All this means that to be successful with plants under glass or anywhere else we must first learn to know them, feel their needs, and thus be able to keep them healthy, vigorous and productive. In many cases the presence of insect pests and fungous diseases is only evidence that the grower is not in close touch with his plants; that he is neglecting some of the fundamental principles underlying their growth, and that until these principles are recognized he cannot hope to attain the highest success in his art.

Dept. of Agriculture, Washington, D. C.

B. T. Galloway.

Foreign Correspondence.

London Letter.

KALANCHOE FLAMMEA.—This is a new introduction from Somaliland which is now flowering for the first time at Kew. It possesses all the characters of a distinct and beautiful greenhouse plant, so that it is certain to become popular. The stems are erect, about a foot high, clothed with opposite spatulate fleshy leaves from two to three inches long, and an erect, long-stalked sub-paniculate cyme of many bright scarlet flowers, brilliant as a soldier's coat. Each flower is three-quarters of an inch wide, or about the same size as the flowers of *Crassula coccinea*, and as they are sub-umbellate they present heads five inches across. The plant has been in flower a month or more and will last for some weeks longer. It produces basal growths freely and promises to ripen seeds. The genus *Kalanchoe* consists of about thirty species, chiefly native of tropical Africa. It is related to *Crassula*.

VITIS VOINIERIANA.—This is a suggested new species in the way of *Voinieriana antarctica*, but of much larger proportions. It is being distributed by Monsieur Sallier, nurseryman, Neuilly, France, who recommends it for outside cultivation in the west and south of France and for winter gardens in England. It has been received by Monsieur Charles Baltet from Monsieur Voinier, of Tonkin, who found it on the Nin-Binh mountains in Laos, where it clammers over rocks, etc., like Ivy, but so vigorously that,

according to Monsieur Voinier, it would soon cover a cathedral. It has stout Rhopala-like stems and alternate trifoliate leaves with long stout petioles, each leaflet being oblong-obovate, four inches by five, the margins serrate, the nerves very prominent, rich glossy green above, the under surface covered with soft hairs. It is said to have enormous grape-like fruit, with large seeds, and to be of peculiar flavor. A plant of it recently added to the Kew collection bears out this description in regard to vigor of growth and the characters of the leaves.

ESCALLONIA LANGLEYENSIS.—Messrs. J. Veitch & Sons have raised this hybrid Escallonia by crossing the well-known *E. macrantha* with *E. Philipiana*. They showed it in flower at a recent meeting of the Royal Horticultural Society, and although it failed to win a certificate it was of interest to growers of hardy plants by reason of its intermediate characters, the flowers and leaves being at least twice as large as those of *E. Philipiana*. The color of the former is pale rose, and they are arranged in dense clusters on the branchlets toward the ends of the stronger shoots. It is likely to find favor as a plant for gardens near the sea in the warmer parts of this country where Escallonias are effectively planted, both as fences and in shrubberies. *E. Philipiana* is quite hardy at Kew, forming a handsome shrub and flowering freely in June.

EXACUM MACRANTHUM.—For many years this beautiful tropical Gentianad has been successfully cultivated at Kew, but it has not yet become a popular garden plant, although several market growers near London have essayed its cultivation. It has numerous erect stems, from one to two feet high, clothed with rich green elliptic-lanceolate leaves three inches long and bearing terminal many-flowered corymbs of rotund deep blue flowers nearly two inches across. It is a biennial and requires the conditions of an intermediate house. This year the plants at Kew are exceptionally vigorous, and this is due to their having been planted out in beds of loam in the newly erected Mexican house. I have also seen beautiful pot specimens grown along with Begonias. The plant is a native of Ceylon, where it is said to be common up to 5,000 feet elevation. It is the only one of the twenty species known that possesses any merit as a garden plant.

ADIANTUM BESSONIANUM.—I noticed this new Fern several months ago, when it received a certificate from the Royal Horticultural Society. We have since grown it at Kew and have now plants of it two feet across. It is, according to Mr. Baker, one of the many forms of *Adiantum tenerum*, but differs from all in its short stout fronds, the pinnae of which are exceptionally thick in substance and which densely overlap each other, as in the smaller *A. Pacottii*. For the discovery and introduction of this plant we are indebted to Mr. Hart, of Trinidad. Last week seventy large imported plants of it were sold at one of the London auction-rooms. For garden purposes the name *Bessonianum* may be treated as specific, *A. tenerum* as now constituted being almost generic. It includes such widely different Ferns as *A. Farleyense*, *A. Lathomii*, *A. Victoriae*, *A. rhodophyllum*, *A. princeps*, etc.

VICTORIA MEDALS.—The Council of the Royal Horticultural Society has commemorated the diamond jubilee of Queen Victoria's reign by awarding medals to sixty of the most distinguished horticulturists in the British Empire. It is intended to maintain the number of sixty by filling up the gaps made by death, so that in time the Victoria Medal of Horticulture will be a coveted prize. It is as impossible to find sixty horticulturists who stand above all their contemporaries in professional ability as to find the sixty handsomest ladies or largest babies in a large community. A considerable number of those at first selected by the Council have for various reasons declined the honor. It may interest many of your readers to see who have been finally chosen for this distinction.

Botanists: J. G. Baker, F.R.S. (Kew), I. B. Balfour, F.R.S. (Edinburgh), Rev. Henslow, Sir J. D. Hooker, Dr. Morris, (Kew).

Curators: F. W. Burbidge (Dublin), F. W. Moore (Glasnevin), G. Nicholson (Kew).

Breeders: J. Heal (Veitch & Sons), J. Seden (Veitch & Sons).

Gardeners: A. F. Barron, W. Crump, Mal. Dunn, J. Hudson, P. Kay, J. McIndoe, E. Molyneux, J. Smith (Mentmore), H. Speed, O. Thomas (Windsor), D. Thomson (Drumlanrig), G. Wythes.

Nurserymen: P. Burr, W. Bull, G. Bunyard, R. Dean, G. Dickson (Chester), J. Fraser (Lea Bridge), H. Herbst, J. Laing, G. Paul, W. Paul, T. F. Rivers, F. Sander, A. Sutton, W. Thompson, H. Turner.

Landscape-gardener: H. E. Milner.

Scribes: G. Gordon (*Gardeners' Magazine*), J. O'Brien (Orchids), J. Wright (*Journal of Horticulture*).

Collectors: W. Boxall (Low & Co.), C. Maries (Veitch & Sons).

Salesman: G. Monro (Covent Garden).

Amateurs: E. J. Beale, Dean Hole, Rev. Dombrain, C. T. Dreury, H. J. Elwes, F.R.S., Professor Foster, F.R.S., Rev. F. Horner, Miss Jekyll, Hon. W. Rothschild, Baron Schroeder, N. Sherwood, M. R. Smith, Miss Willmott, G. F. Wilson, Rev. Wolley-Dod.

London.

W. Watson.

Plant Notes.

RUDBECKIA GOLDEN GLOW.—We have no lack of bold yellow flowers from midsummer onward, and yet additional experience with this *Rudbeckia* commends it for a place in the wilder parts of the hardy plant border. As we have before stated, it is probably a double form of *R. laciniata*, a species which is not often seen in cultivation. It is really a plant of distinct character, with attractive foliage and abundant bloom. The stems are at this season quite six feet high, and although they bear up fairly well against storms and winds they would be the better for some support. In the July number of *The Mayflower* it is stated that this double *Rudbeckia* was probably sent to Mr. John Lewis Childs by a correspondent from Stephenson County, Illinois, where it is said to grow wild in open woods, and is popularly known as the Wild Yellow Dahlia. As we have before stated, the color is not a pure yellow, and the flower is somewhat disheveled without having the grace of the Cactus Dahlia. Nevertheless, its hardiness, the ease with which it is propagated, the rapidity with which it increases and its rather stately habit make it worthy of notice.

Cultural Department.

Notes on Crinums.

ALTHOUGH *Crinum Powellii* came to me with a reputation for hardiness, its reappearance in the border each season is always in the nature of a pleasant surprise, for it is rather a tropical plant in aspect, and, with the exception of one of its parents, *C. longifolium* (Capense), none other of the *Crinums*, I believe, has any claims to hardiness. Yet planted out here in a border sheltered, except to the south, it has endured our winters with the very slight protection of a few leaves or thin layer of ashes, and these possibly may not be required. It is, of course, cut to the ground promptly by the first frost. It is a noble plant with a globose bulb and short neck. It produces fifteen or twenty leaves, some of which are fully four feet long, rather soft in texture and partly channeled. The flowers, eight or ten in number, are borne on a peduncle two feet or two and a half feet high. Those of my specimen are a soft light pink with wide petals about two inches long when well grown. While the flowers are a decided improvement on those of *C. longifolium*, they are inferior to those of its other parent, *C. Moorei*. Where the climate is no more rigorous than this, *C. Powellii* will prove a desirable plant in the garden for its noble habit, distinctness and practical hardiness.

But the most desirable and handsome of the *Crinums* is *C. Moorei*, which is worthy of space under shelter. This species has a round bulb with a straight long neck, from the top of which its handsome leaves stand out obliquely, usually about two feet long and evergreen. New growth commences usually in the winter, and its handsome flowers are produced with



Fig. 38.—Douglas Spruce (*Pseudotsuga taxifolia*).—See page 292.

great regularity in late spring. It is a fine plant for pot-culture and does well when pot-bound if occasionally fertilized. Though I have grown a number of *Crinum*s, none of the others, either evergreen or deciduous, interest me particularly. It is too much trouble to shift them out-of-doors for summer growth and store them in the winter, when the same labor can be expended more profitably on a selection of many handsomer *Amaryllids*. *C. pedunculatum* is a species which is retained for the purpose of testing some time its possibilities in the way of growth. With my best efforts at repression, it is now four feet high and is flowering, with a peduncle three feet long furnished with twenty flowers; these are white, with long narrow petals, purple filaments and brown anthers. The bulbs have leafy columns five or six inches in diameter. It appears to be a plant worth trying in a wet warm place in the garden, but not desirable in valuable space under shelter.

Elizabeth, N. J.

J. N. Gerard.

Flower Notes.

IN his note on the showy *Alströmmeria* last week, Mr. Cameron speaks of it as perfectly hardy, which does not seem to be always the case. I have one clump of this plant which has flowered for six or seven years, without fail, and it increases in size and vigor every year, but some of my neighbors find it a difficult plant to keep. Even when in soil that is thoroughly drained, the thick fleshy roots sometimes rot without any apparent cause. Standing water is almost certain to be fatal, and I have thought that perhaps the freezing and thawing in spring sometimes causes injury. At all events, the thriftiest plant I know stands on the north side of a low fence where the ground remains frozen for weeks sometimes, after it has been soft on the south side during the same time.

This has been a trying year for *Cannas*. June was an exceedingly cold month, and those that were first set out-of-doors made comparatively little growth. The advantages of the dwarf kinds are manifest, for the reliable *Madame Crozy*, although hardly more than a foot high, is bearing as many flowers as usual. If the seed-pods are removed as fast as they appear the vigor of the plant will be thrown into the flowers as they continue to appear, and they will improve until frost.

Our common *Clematis Virginiana* is very effective now, as it festoons shrubbery by the roadside, and its rich green foliage and dainty flowers make it worthy of a place in the wild garden or naturally planted grounds. There are some strong-growing shrubs which are not injured by it, so that it ought not to be excluded from park shrubberies. *C. coccinea*, however, is never oppressive, having very scant foliage, so that it wanders through a large shrub with little observation and doing it no harm. Its presence is hardly made known until the bright coral-colored flowers are seen here and there on long stems well above the foliage of the bushes. This is a first-rate use to make of *C. coccinea*, for it has the advantage of blooming in a sparing way all the season through, so that every day a few flowers are produced.

Among our showy wild flowers is *Monarda didyma*, or *Crimson Balm*, whose bright red flowers are common in midsummer in the middle states along shady streams, where it often grows in large masses, occasionally to the height of from three to four feet. It is well worth growing in the garden, where it responds to kind treatment and in deep soil reaches a height of four or five feet, with larger flowers, whose glowing color makes them conspicuous for a long distance. The plant has a fragrance of *Bergamot*, and it is altogether the best of the native species of *Mouarda*.

The dark blue flowers of *Platycodon grandiflorum*, an old Bell-flower which has been familiar to gardens for more than a century, are now very beautiful, as they hang gracefully from the extremities of their slender stems. Some of them are nearly white, and they vary through different shades of blue, but those with the darkest flowers are the most effective. The plant has long fleshy roots, which are proof against our coldest winters, and in good soil which does not get too dry in summer they reach a height of three feet and make an interesting picture for a long time.

Lythrum Salicaria is not uncommon on the banks of rivers where it has been naturalized, for it is not a native plant, and its growth makes it singularly effective for such a situation. Its spikes of purple flowers are five to six feet high, and they are nowhere more effective than where they can be reflected in the water and have a background of dark foliage. Like the other *Loosestrifes*, the plant needs little looking after when it has once taken hold of the ground, and it keeps in flower a long time. The dealers in hardy plants have two or three well-marked varieties which are worth growing, and all of

them when cut can be loosely arranged in large vases, so as to be very effective where such decorations are wanted.

New Brunswick, N. J.

S. A.

Zonal Pelargoniums.

GERANIUMS have received considerable attention in recent years from hybridizers, and a long list of good varieties is now in commerce, which for brilliancy of coloring and varied usefulness is hard to equal in any class of plants. A comparison of our two most popular bedding *Geraniums* of to-day with the two most popular sorts of twenty years ago, namely, *General Grant* with the old *Tom Thumb*, and *Pink Perfection* with the old *Master Christine*, will give some idea of the rapid improvement during that time. The gain has been principally confined to the semidouble and single sections. The old stiff double forms are seldom seen now, probably owing to their shy flowering, lanky habit and their stiff-looking trusses. The semidouble ones are most popular and by far the most suitable for bedding purposes, and admirably adapted for winter flowering in the greenhouse, either for general show or for cutting.

The single varieties fade readily under the sun's rays, and do not last nearly so well as the semidouble kinds. They are, therefore, not suitable for bedding purposes, and generally can only be brought to perfection under greenhouse treatment. Their bright flowers are most appreciated during the winter months. To procure the most serviceable plants for flowering, their cuttings, made from firm short-jointed wood, should be struck during July. They should be inserted singly in three-inch pots filled with a free, porous compost composed of equal parts of sand, leaf-mold and turfy loam. With careful shading and watering the cuttings will soon strike root, and should be shifted on as the pots become filled with roots, the final shift being into six-inch pots. The soil for these later shifts need not contain so much sand or leaf-mold, but should be moderately enriched. Occasional pinchings of the points of the shoots will be necessary to keep the plants bushy, and all flower-buds should be removed as they appear.

The aim during the building-up season should be to keep the plants growing freely and at the same time to procure firm short-jointed wood. This can probably be done best by growing them in a cold frame with the sashes off, except during heavy rains, during August and September, removing them inside before danger of frost. For winter quarters they need a bright house with a night temperature of forty-five degrees, and plenty of air admitted during suitable weather. When the flowering-pots are well filled with roots and the plants begin to bloom freely an application of weak liquid manure will be very helpful. They may be allowed to begin to flower in October, and with proper care they will continue to produce an abundance of bloom throughout the winter. The perfection to which they can be brought with a little extra care is remarkable, and cultivators who have never made any special effort with them would be agreeably surprised at the difference it makes.

I always think single *Pelargoniums* the most attractive for greenhouse decoration, though they are not nearly as useful for cutting as the semidouble forms. The varieties are numerous, and all have more or less distinctive features, so that the selection of the kinds one may think the best is largely a matter of individual taste. If asked to name the best varieties of their respective colors I should have no hesitation in choosing *Athlete*, scarlet; *Queen of the Belgians*, white; *Day-break*, pink; *Madame Reydelet*, salmon. But there are so many really good varieties that it is needless to enumerate more.

Tarrytown, N. Y.

William Scott.

Three Good Conifers.

I RECENTLY saw a specimen of *Pinus parviflora* which was nearly twenty feet high and broader at the top than near the ground, although it was well branched to the turf. The short, silvery white leaves give it a very distinct appearance which is unlike that of any other Pine I know. It is perfectly hardy in New England, and there seems no reason why it should not become as tall a tree as it does in the mountains of Japan, where, according to Professor Sargent, at elevations of more than 5,000 feet above the level of the sea, it is found growing singly or in small groves, and reaching a height of sixty and sometimes seventy feet. The conifers which can be trusted to grow in the gardens of eastern North America are not very numerous, and the fact, therefore, that this beautiful Pine flourishes in this section ought to be more generally known.

Another desirable and hardy Pine is *Pinus Koraiensis*. It

came here originally from Japan, but is a native of the Korean peninsula and the Manchurian coast region. Like *P. parviflora* and our native White Pine, it has five leaves in a cluster, but it is a comparatively small tree, rarely being more than thirty feet high. Its pale green leaves do not fall until the end of three or four years, so that it has the appearance of being more densely foliated than other White Pines whose leaves are shorter-lived. It is perfectly hardy as far north as New England, and its abundant leaves and the bright red color of its young shoots give it a distinct and attractive appearance.

Abies Cilicica is a comparatively rare tree in collections, although there are fine specimens to be seen in Mr. Hunnewell's pinetum, and in the Hoopes pinetum at Westchester, Pennsylvania—trees forty feet high, standing in compact, sharp-pointed cones and branching from the ground with pale silvery foliage. This Fir is a native of the Taurus Mountains, and in ancient Cilicia it forms extensive forests at elevations of from 3,000 to 7,000 feet above the sea. It does not flourish, however, in western Europe, because its young shoots, which appear very early, are often caught by late frosts, and for this reason European nurserymen do not propagate it largely, and it has never been a common tree in commerce. Nevertheless, it is excelled in beauty by none of the Silver Firs that are hardy here, except the Colorado varieties of *Abies concolor*.

Newport, R. I.

J. L.

The Bermuda Lily Disease.

THE disease which attacks the Bermuda Lily, so largely forced for Easter decoration in this country, usually destroys from twenty to sixty per cent. of the crop, and no one knows how many of the bulbs are lost in the fields where they are grown. The disease has been attributed to various causes, and an investigation has been carried on by A. S. Woods, of the Division of Vegetable Pathology of the United States Department of Agriculture, for three years past, for the purpose of ascertaining its real character, so as to find, if possible, some hopeful remedial treatment. The result of these studies will soon be issued in a bulletin, but in view of the fact that the bulbs are now coming in, Professor Galloway makes a brief statement in the *American Florist* of the general facts discovered, from which we quote:

The Lily disease is characterized by the spotting and distortion of the leaves and sometimes the flowers and a general stunting of the plants. When the flowers are spotted the plants are unsalable, regardless of the condition of the leaves. Where the flowers, however, and the upper whorls of leaves are not injured the plants may still be sold for certain decorative purposes.

The disease has been attributed to worn-out soil, premature removal of flowers and stems, premature harvesting, improper propagation, bad treatment during forcing, and the attacks of various insects and fungi. All these matters have received more or less attention, and experiments, extending through several seasons, have been made to prove the truth or falsity of the various theories. As a result of the work the evidence is sufficient to warrant the statement that the trouble is not due to any one thing, but is brought on by a combination of factors, involving long-continued improper selection, propagation and cultivation in the field; the work of a mite (*Rhizoglyphus echinops*); injuries resulting from the punctures of plant lice, or aphides, and the attacks of certain bacteria and fungi, notably an *Oospora* related to the one associated with potato scab. The injuries from the mites, aphides and fungi are always more severe on plants which have been weakened by improper methods of propagation, selection, etc., while being forced.

In regard to preventive measures, it is plain that work must begin where the bulbs are grown in the field. Every plant that shows evidence of disease should be destroyed, and only the strongest and healthiest bulbs should be used for propagation. A second selection should be made when the plants from the scales are being transferred to the field. A third selection should be made when the bulbs are prepared for shipment, so as to reduce as much as possible the difficulties encountered by those who force the bulbs. In the field, rotation of crops should be practiced, for bulbs long grown on the same soil will have more of the mites and other parasitic organisms to contend against, and hence will run greater risks of being weakened. The bulbs should be ripened with their stems on and should be dug only when fully matured and rested.

When forced, bulbs should be planted in well-drained, well-

aerated soil, containing not more than one-fourth well-rotted manure. All injured bulbs should be thrown out, and in watering the young foliage should be kept as dry as possible, for it may be injured by having water injected into the tissues. In feeding avoid the use of solutions of horse, cow and sheep manures, as they have a tendency to clog the soil, resulting in asphyxiation of the roots and consequent injury to the top. Soluble chemical foods may be used to advantage, but caution must be exercised in applying them.

Correspondence.

Electrical Attraction of Trees.

To the Editor of GARDEN AND FOREST:

Sir,—A Frenchman, Monsieur Dimitrie, in making experiments with the resistance of various materials to the electric spark, has sought to know the reason why the different kinds of trees are so unequally susceptible to lightning. Samples of beech and oak being exposed to the spark of a Holtz machine, showed that the oakwood had been thoroughly traversed by the spark after one or two revolutions of the machine, while for the beech twelve to twenty revolutions were necessary. Black poplar and willow required five revolutions. The woods having a watery sap appear to have offered no resistance to the electric spark, but the resinous woods, on the contrary, exhibited considerable resistance. Trees of starchy constitution, poor in fats, such as the Oak, Poplar, Willow, Maple, Elm and Ash, offer far less resistance than those rich in fats like the Beech, Walnut, Linden and Birch. Experiments with the Pine (which in winter contains an excess of oil, but in summer is as poor as the trees of starchy fibre), show that in the summer season it is as easily attacked by the spark as the Oak, while in winter it offers the same resistance as the Beech and the Walnut.

It was also shown that by extracting the oil (by means of ether) from the walnut and beech wood, they became as susceptible to the spark as the woods of starchy fibre.

Another point of interest in the experiments showed that living, growing woods offered greater resistance than dead wood. Bark and foliage are always bad conductors of electricity, but that is secondary to the conducting power of the tree in its ensemble. Trees, and the parts of trees which are the best conductors of electricity, are more frequently struck by lightning than those trees and parts which are bad conductors. Thus, in the forests of the principality of Lippe, from 1879 to 1885, the trees struck by lightning were 159 Oaks, twenty-one Beeches, twenty Fir-trees, fifty-nine Pines and twenty-one other trees of various kinds. The domain covered by observations showed about two per cent. Oak, seventy per cent. Beech, thirteen per cent. Fir and six per cent. of Pines. The danger would then be five times for the Fir, thirty-three times for the Pine and forty-eight times greater for the Oak than for the Beech.

The danger to trees from lightning is great in proportion to the electrical conductivity of their wood. The influence of this conductivity of trees upon the frequency of lightning strokes is shown by the fact that dead wood (good conductor) is more frequently struck than green wood (bad conductor), and that the trunks of trees are struck oftener (in the Lippe forests 197 times) than the tops (seventy-eight times).

The author discusses the influence of the site and soil upon lightning strokes of trees. He recognizes that the proximity of streams augments the danger. Isolated trees appear to be more exposed than those massed in clumps; but when the electric tension is very high, all trees are liable to be struck.

Chicago, Ill.

Rosa G. Abbott.

The Vitality of Seeds.

To the Editor of GARDEN AND FOREST:

Sir,—Nine years ago I took up about fifty clumps of Lily-of-the-valley for forcing, which contained seeds from Foxgloves scattered through the bed. The clumps were placed along the edge of the greenhouse path. After the Lily-of-the-valley had been forced and began to die away, seedling Foxgloves came up, and there has never been a spring season since when a large number did not germinate, and this season there are several hundred. Ten years ago last June I planted seeds of *Hibiscus militaris* in the open border, and every year since I have found a number of seedlings; this year half a dozen. In the place where six years ago were planted seeds of Rocky Mountain Columbine, seedlings continue to germinate, although none have been sown there since. Tobacco, Verbenas, *Ageratum*,

annual Larkspurs, came up for years after in the same place, and African Marigolds are apt to become weeds if left to ripen seeds. *Begonia semperflorens* sowed itself freely last summer, and this spring we have a considerable number of seedlings up. Garden Geraniums often come up after the seed has been in the ground through the winter.

Wellesley, Mass.

T. D. Hatfield.

Taxation for Municipal Improvements.

To the Editor of GARDEN AND FOREST:

Sir,—Your correspondent, A. O. Glees, in his letter, published July 21st, on The Cost of City Parks, has suggested a solution of a vexed question which arises in every special assessment for park and other improvements. I have had some correspondence with the Board of Street Openings regarding a similar matter, and although Mr. Glees' solution appears just, I should like to have some one explain how the scheme proposed can be put into execution. The scheme seems to me impractical, the law and practice being against the plan proposed.

The Law Department wrote me recently as follows: "According to the law as it now stands, assessments are limited to half the value of the property, as found by the Tax Commissioners for the purpose of taxation. When we come to open a street the large unimproved tracts, which are assessed too low, cannot be made to pay their fair share of the assessment, while the small owners who have improved their property, and whose property is valued for the purpose of taxation relatively higher than the large unimproved holdings, have, in consequence, to pay more than their share. So the original injustice is not represented by the relative difference in the amount of taxes actually paid, but they should be increased by the relative difference in assessments made necessary by the disproportionate valuations of the Tax Commissioners."

Here is a condition of affairs detrimental to municipal improvement, and it seems to demand attention.

New York.

Benjamin Doblin.

Roadside Notes.

To the Editor of GARDEN AND FOREST:

Sir,—When one chances to come upon a piece of road diversified with groves of trees screening it from the sunshine, and a variety of wild growths clothing the space by the side of the track, the thought always comes, why need we have such barren, sun-smitten roadsides? I recently drove over a charming road where wild Grapevines luxuriated in freedom. Sometimes they crept from the track along the grass to the fence which they covered for rods, or they would climb trees and wander over shrubs. *Smilax rotundifolia*, with its globular clusters of berries well formed, made a graceful companion, and clumps of *Monarda fistulosa* were abundant, looking cool in pale purple beside the glowing flame-color of *Asclepias tuberosa*, now in its glory, and spreading over field and lawn as well as roadside. On the north side of a grove, *Rudbeckias* were making a rich display among the white Yarrow. Several kinds of the Hawkweed family were standing erect and stately, their branching tops just coming into flower, a striking feature among the more humble growths, though less brilliant in blossom than many of their neighbors. Here, too, was Pokeweed, *Phytolacca decandra*, a truly regal plant, of which the red-purple fruit is its chief ornament. *Tephrosia*, though out of bloom, added in large patches of pale green an unusual tint. Along moist places, among fringing Willows and Rushes, *Asclepias incarnata* spread its crimson umbels. In shady nooks a pretty pink *Desmodium* was blooming. Such delicacy of color is rare at this season among wild flowers, and even the Swamp Rose, *Rosa Carolina*, is of a deeper hue. Of the latter, beside many fine specimens of usual size, a cluster of bushes were noted that had been cut to the ground by some ruthless hand, and now, though but a foot or two in height, were covered with a profusion of flowers. Upon a shallow pool was growing Water Crowfoot, *Ranunculus multifidus*, and on a running stream *R. aquatilis*. These curious plants are of interest owing to their peculiar foliage, which is submerged.

These wild roadside plants offer a pleasant study to any one who has an eye for natural beauty, and those who make it their business to "clear up" the highway occasionally seldom carry their designs to the extent of drawing away the debris. A little discrimination, however, in eliminating what might prove troublesome, and allowing the rest to grow in a natural way, would add largely to the beauty that is so freely

afforded us, besides giving us lessons in the natural grouping of plants and flowers, which we sadly need.

White Pigeon, Mich.

Dorcas E. Collins.

Recent Publications.

A New Insect Pest in Massachusetts.

SINCE our allusion to the Massachusetts law against the brown-tail moth we have received a *Special Bulletin of the Massachusetts Agricultural College Experiment Station*, prepared by Dr. Fernald and A. H. Kirkland, which gives an interesting account of the insect which is called *Euproctis chrysorrhoea*, although other generic names have been used for it, as *Bombyx*, *Liparis* and *Porthesia*. It seems that on the 8th of May this year word was sent to the office of the Gypsy-moth Committee that some insect was destroying the leaves of the Pear-trees of a citizen of Somerville. An agent of the Department was at once sent there, who found no gypsy-moths, but reported that some other insect had made "tents" at the tips of the branches of the Pear-trees. After a time examination of the caterpillars by Professor Fernald proved them to be the well-known destructive pest of Europe, the brown-tail moth. The males are pure white, with a satiny lustre on the fore wings, which sometimes carry a few black dots and a reddish brown tuft at the end of the abdomen. The antennæ are white fringed with pale yellowish hairs, and the moth measures about one and a quarter inches from tip to tip of the expanded wings. The females have no black spots on the wings, the anal tuft is larger and lighter, and the antennæ are shorter. The expanse of the wings is about one and three-quarter inches. The eggs are laid in July in masses of from two hundred to three hundred, usually on the under side of the leaves, where they hatch in a short time, and the young caterpillars soon leave nothing but the skeletons of the leaves. While still young these caterpillars begin to construct a regular habitation at the end of the twigs by drawing together a few leaves, lining and surrounding them with silk, where they remain all winter. Before the leaves begin to grow, the caterpillars emerge from their winter retreat and feed on the swelling buds. The full-grown caterpillar is sometimes one and three-quarter inches long. When the caterpillars are done feeding they change to pupæ in the early part of June among the leaves, spinning an open cocoon of coarse silk. In a short time the moths emerge, and after mating lay their eggs.

Careful inquiry seems to establish the fact that this insect has been known about Somerville for some five years, and probably it existed in small numbers for several years before it attracted attention, and then it was supposed to be the gypsy-moth. Men employed in destroying the gypsy-moth probably have supposed them to be some common American species, and paid no attention to them, as their work, by act of legislature, was directed against the gypsy-moth solely. The area in which the insect has done serious damage this year is nearly circular in outline, and has a diameter of about a mile. But the pest is already found in single colonies at some distance, and no doubt it has been distributed by traffic to many places from which no report has yet been heard. The Pear seems to be its favorite food-plant, and as these trees greatly outnumber other fruit-trees in the settled portions of Massachusetts, the loss is severely felt by property owners. It feeds, however, on many other trees, and among these the bulletin mentions the following: Basswood, Sugar Maple, White Maple, Sycamore Maple, Plum, Cherry, Wild Black Cherry, Peach, Crab-apple, Apple, Quince, White Ash, American Elm, Black Walnut and Weeping Willow. Of shrubs and climbers the Grape, Virginia Creeper, Wistaria, Raspberry, Weigelia, *Spiræa Thunbergii*, Blackberry, Rose, Japan Quince, Currant and Gooseberry are named. It also feeds upon the Geranium, Burdock Plantain, Rhubarb, Strawberry and many other herbs, so that the number and

variety of its food-plants indicate that it may become a serious pest.

During the latter half of May the caterpillars swarmed from the defoliated Pear-trees over the ground and walks and fences in search of food. Trees in full leaf in the path of this hungry army were stripped in a few days. For example, they attacked a large Cherry-tree covered with dense foliage one morning, and five days later hardly a green leaf remained on the tree and the half-grown fruit was nearly devoured. In a badly infested orchard the noise made by the feeding of these myriad caterpillars could be plainly heard. They crawled over everything, and the sweeping and the washing down of the masses of caterpillars from piazzas and the walls of houses is of daily occurrence. An annoying feature of the invasion was the painful irritation caused by the insects when coming in contact with the skin. The hairs of the caterpillar are brittle and easily detached, and produce an intense irritation when they touch the skin, and in many cases the suffering was so severe as to require the aid of a physician. No birds except the English sparrow have been discovered feeding on these caterpillars, and these took them but sparingly, but the sparrows themselves have driven away our native birds which are known to eat hairy caterpillars, so that in this way they may aid the insects more than they injure them. No predaceous insect has as yet been found attacking them, and no parasites. In Europe it is said that their thick hairs protect them from small birds, but they have many parasites.

As a remedy it is recommended to remove and burn the egg masses in July before they hatch, which can easily be done on shrubs and low trees within reach. While the caterpillars are feeding on the surface of the leaves during autumn the trees should be sprayed with arsenate of lead or Paris green. The most effectual means of destroying the insect, probably, is to remove and burn the tents at the tips of the branches in winter with long-handled pruning-shears for trees of ordinary height, and ladders may be used for larger ones. The tents when cut should be gathered and burned at once. If these methods have been neglected and the caterpillars have emerged from their winter quarters, the foliage should be sprayed at once with arsenical poison. Later, when the caterpillars are very numerous on a tree they may be jarred to the ground by striking the branches with a mallet bound with cloth, and if the ground is then sprayed with a strong kerosene emulsion all the caterpillars with which it comes in contact will be destroyed.

As long ago as the year 1734 laws were enacted in France requiring landowners to destroy these caterpillars. Later the laws were extended to include the gypsy-moth and some other injurious insects, and Belgium and other European countries have passed similar acts. These laws, however, are not rigidly enforced, and since the insect is found almost over the entire continent of Europe, the question of exterminating it is not considered. What is contemplated is the reduction of the pest to comparatively harmless numbers, without considering the question of its spread. In Massachusetts the conditions are quite different, and as the insect is now found within a very limited territory, an attempt will be made to exterminate it. The gypsy-moth is now found over a much greater extent of territory and is a more difficult insect to deal with, and surely if it is possible to exterminate the gypsy-moth the effort to suppress this new pest is worth making.

The wisdom of the act of Congress of 1895, which required the publication of the annual report of the Secretary of Agriculture in two parts, is made apparent by the appearance once more of the *Year Book of the Department of Agriculture*. Our readers will remember that the volume which contains the business and executive matter necessary for the Secretary to submit to the President and Congress is quite distinct from this Year Book, which is made up of papers specially suited to interest and instruct

the farmers of the country and to explain in a general way the operations of the department for their information. It is not our intention to make any review of the contents of the book at this time, which we may say consists of some thirty papers, many of them illustrated, and all prepared by experts in various fields of agricultural inquiry. We give the titles and authors of a few of these papers: "The Use of Steam Apparatus for Spraying," by L. O. Howard; "Some Common Poisonous Plants," by V. K. Chestnut; "The Blue Jay and its Food," by F. E. L. Beal; "Diseases of Shade and Ornamental Trees," by B. T. Galloway and Albert F. Woods; "The Improvement of our Native Fruits," by L. H. Bailey; "Pruning and Training Grapes," by E. G. Lodeman. It will be seen that subjects of this kind, treated as they are by men of recognized standing in agricultural science, are worth more than mere passing notice, and these are followed by a hundred pages of tables, statistics and condensed information, arranged for convenient reference. In a prefatory note by Assistant Secretary Dabney it is stated that these condensed statistics, together with practical recipes and directions, have been prepared with a view of making this appendix a vade mecum for the farmer, so that the series of Year Books, which are thoroughly indexed for this purpose, will become a reference library of increasing value to the agriculturist. An edition of 500,000 copies of the Year Book has been issued for free distribution, and the only regret we have about this publication is that it has not been more carefully edited. Of course, this defect is well known to Mr. Dabney, who states that the material for this and the two preceding volumes of the series has been prepared by busy scientific workers in the intervals of other duties, and the only revision the work has received has been such as it was possible for an executive officer to give, who only had one assistant to help him. Since it has become the annual practice to issue such a volume and publish it in so large an edition, a wise economy suggests that it should be carefully revised and edited by a corps of trained specialists.

Mr. John G. Lemmon contributes to the second part of volume ii. of the *Bulletin of the Sierra Club* a paper on the California Conifers, which will aid, no doubt, the enterprising and energetic climbers of the club to recognize the trees they encounter in their mountain excursions and thus to be in a position to add to our knowledge of the distribution of the Conifers of the California Sierras. Mr. Lemmon's arrangement and treatment is practically similar to his previous works on the same subject. The present part is devoted to *Pinus* and *Larix*, to be followed in a succeeding number of the bulletin by an account of the other genera of Conifers. We notice that Mr. Lemmon recognizes more species of *Pinus* than other observers consider desirable, but, after all, the limitation of species is largely a matter of judgment, and Mr. Lemmon's opportunities to see these trees in their native haunts has been surpassed by that of only a few other observers.

Notes.

Redwood has been tested for paving purposes in San Francisco, and experiments have proved that it is a satisfactory material. This means probably an increased demand for Redwood timber and the more rapid felling of the limited supply of that timber now standing.

The Gardeners' Chronicle states that many letters have been received by the editor in reference to the Victorian medals spoken of in our London letter of this week. Some of these are written in a strain of indignation, but they generally treat the humorous side of the question. The editor makes the wise comment that, considering the delicate nature of the circumstances and the excellence of the intention, a discreet silence will be most acceptable to all concerned.

To prove that Indiana can still turn out some of the best oak on the continent, *The Northwestern Lumberman* states that thirty carloads of oak ship-timber have been sent from Wabash to Toledo in sticks from thirty to forty feet long and

sixteen inches square. It goes to Buffalo for use in building vessels for the lake marine. Of late years Indiana farmers have not been disposed to rush their timber to market regardless of prices. The result is that much good oak is still found in that state.

Peas, string-beans, celery, corn, cucumbers and eggplants may now be had as fresh as they ever reach the city buyer, since much of the present supply of these vegetables comes from Long Island, New Jersey and other near-by points. Turnips, carrots, potatoes, cabbage, onions and peppers also come from neighboring farms, as do tomatoes, while Lima beans are supplied from Maryland and red sweet potatoes from Virginia and North Carolina. Cauliflower and squashes are among the staple vegetables of the season, but the gathering and shipment and sales of all these products have been seriously interfered with by the frequent heavy rains of the past two weeks.

In view of the attention which the flowering of *Lathyrus splendens* at Kew has attracted, Dr. Franceschi writes to say that the color of these flowers is hard to define, but that it is rather a shade of crimson than of scarlet. This Pea only grows in the extreme south of California and in Lower California, being a native of the high desert region of the interior. It adapts itself, however, to liberal watering, and in this case, with sufficient drainage, it will continue to grow and flower all summer, and not die down as it does in its native habitat, where it is essentially a winter bloomer. Since frost often occurs on these highlands, Dr. Franceschi predicts that it will prove hardy in those parts of England where *Romneya* and *Fremontia* have been grown successfully.

The Fruit Trade Journal quotes a complaint from Florida about the scarcity of fruit in that state. Of course, there is no lack of oranges and grape-fruit in the winter, and of berries, pineapples, pears and grapes in spring and early summer, and in the autumn there are some bananas. But just when other states have an abundance of fruit and fresh vegetables—that is, in late summer and early autumn, there is a deficiency which needs to be supplied. It seems odd to northern gardeners that vegetables should be lacking at the season which is most productive here, and we should think that even if irrigation or generous fertilizing was required, there ought to be no lack in Florida gardens at this season. As for fruits, the problem is more serious, but the wide-awake horticulturists of that state ought to be able to keep a subtropical climate in full producing power all the year round.

A discussion of the merits of the newer Sweet Peas takes up a considerable space in *The Florists' Exchange* for the current week. Ordinary growers do not appreciate some of the alleged improvements in these flowers, and it is impossible to discover any real difference either in form or color or habit in some of the varieties sent out. What we wish to call especial attention to is that while Mr. Eckford has for many years been the hybridist to whom the world looked for the best work in this direction, many beautiful varieties are now produced in this country. Some of the seedlings of Burpee, at Ford Hook, Doylestown, Pennsylvania, and those of Walker, an expert who is working in Oregon, are said to be equal, if not superior, to any forms hitherto raised. It is said that Mr. Burpee made 373 separate tests this year, of which 348 were of named varieties and the remaining 25 of mixed kinds.

We have already alluded to the fact that we are not getting a single bunch of bananas from Cuba, although formerly at least 2,000,000 bunches came from that island every year. Of course, there is no lack of the fruit in this country, for Jamaica, Porto Rico and other islands, Mexico and Central America have all increased their exports to supply the market, and so energetically have they carried on the work that bananas are now cheaper than ever, and the supply has kept increasing to meet a constantly growing demand. Materially, this must be a great loss to Cuba, and, indeed, it is a loss to American capital, for the great importing firms had plantations covering thousands of acres, and eastern Cuba was rapidly becoming a continuous banana garden. A large part of the plantations have been destroyed during the war and the most fertile part of the island is now producing nothing of value.

Mr. Charles A. Keffer, in writing on the forest fire laws of Minnesota, says that legislation of this sort acts quite as much as an educational as a prohibitive force. In his travels through Minnesota, in both prairie and forest regions, Mr. Keffer frequently saw copies of the law in schools and post-offices. Otherwise careless citizens have thus had their attention called to this important matter, and the most prolific cause of forest

fires, thoughtlessness or carelessness, has been averted; for there can be no question that neglect or lack of proper care in the kindling and extinguishing of useful fires is a most prolific source of danger to the forest. The pleasure-seeker, whose attention has been attracted at every station between his city home and his outing-place, is awakened to the damage his carelessness may cause. The woodsman, to whom life-long familiarity with camp-fires has only brought indifference in his handling, will be arrested and restrained by the knowledge that such carelessness is criminal. The railroad employee will be more and more careful in cleaning his right-of-way, knowing the danger of dismissal which is likely to result if his company is held responsible for damage that he has caused.

The Maryland peach crop, especially that on the Eastern Shore, was seriously injured by a frost on the 20th of April, which killed a large portion of the fruit-buds in the tidewater section of the state. But it is true also that the curculio has done an uncommon amount of injury, as the great number of specked peaches coming to this market indicates. Peach growers have never felt the necessity of combating the curculio as plum growers are compelled to do. And certainly they have not yet taken ordinary precautions against this danger. Last year the peach crop was unusually large and the overloaded trees produced much small and inferior fruit, which was allowed to remain in the orchard. This gave the curculio an unusual opportunity, and Professor W. G. Johnson, the state entomologist, suggested to the growers last fall that it would be wise policy to destroy as many of the small peaches as possible so as to prevent the larvæ of the curculio from entering the ground for pupation. There is no doubt that if this had been done the crop would have been less seriously injured. The fact that Professor Johnson predicted this danger ought to lead peach growers to listen more carefully to expert counsel in the future.

Certain species of *Cattleya*, notably the ever-varying forms of *C. Gaskelliana*, are found in the highest branches of the giant trees which form the primeval forests of many of the valleys of Venezuela. In order to get the best plants these trees are felled, and from the harvest thus produced only the very finest plants are taken, the smaller ones being left to perish with their natural supports on the ground. In writing of these facts, a correspondent of *The Orchid Review* says that many valleys are thus stripped of their virgin forests and many of the finest species of Orchids are being surely exterminated. Even now the well-known *Oncidium Papilio* is getting scarce in Trinidad. Mention is made of a collector who took 1,500 fine plants of *Cattleya Gaskelliana* from Venezuela, but in order to do this he had cleared out a valley and left 10,000 small plants and seedlings to perish. Only plants like the 1,500 selected ones would meet the demands of his London employer, and the enormous cost of transportation from any distance inland in South America makes this destructive system necessary to one who wishes to make his expedition pay. It is to be hoped that the Government of Venezuela will put some check on this vandalism, as has been found necessary in other countries.

Delaware, Niagara, Moore's Early and the small green Thompson's Seedless grapes are all represented in our markets now, and come from South Carolina and Georgia. Black Hamburg and White Muscat of Alexandria grapes, from Newport glass houses, are seen in the fancy-fruit stores, and sell for \$1.50 a pound. Alligator pears, from Caraccas, were seen here last week, and some of the same fruit has since arrived from Colon. Green ginger-root, from Jamaica, is one of the latest receipts among new products of the season, and the first eastern apricots are now arriving from the interior of this state. The supply of pineapples is beginning to decline, but many other fruits, such as apples, pears and plums, are coming in increased quantities, and indeed the supply of fruits in this city was never larger nor more varied. During last week eighty-four car-loads of California fruits were sold here, the largest weekly sale made this summer. Tragedy prunes are especially plentiful, as are Bartlett pears, and the latter are now of large size and highly colored. Decker, Foster and Early Crawford peaches are among the best sorts now coming from California. A few peaches are coming from New Jersey, Delaware and Maryland, as well as from North and South Carolina and Georgia, but none of these are of the first quality. Even the largest and best in baskets containing eighteen selected fruits for \$1.00, are only notable for their extra size, since they lack color and flavor. Wild Goose plums and cherries, from near by, are becoming scarce, and raspberries and blackberries have proved perishable stock during the persistent rains of the past fortnight.

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The Use of Trees and Shrubs with Leaves of Abnormal Colors.

A BOSTON correspondent writes in a discouraged tone about the planting he observes in the suburbs of that city. It seems to him that popular taste is setting strongly toward *Prunus pissardi*, the Golden Elder, variegated *Negundos* and the like. We have no doubt that too many trees and shrubs which are valued for the abnormal coloring of their leaves are used about Boston, and, in fact, about every other American city. Unless our own observation is at fault, however, the tendency of public taste, as a rule, is in the other direction, by which we mean that the people who plant nowadays are more inclined to follow the teachings of nature in this respect than they were a few years ago, when the tree agent, with his highly colored catalogues, was more pervasive and influential than he now is. The so-called foliage plants with brightly colored leaves and hues, set in patterns of various sorts, are certainly not as prevalent as they once were, and it is very evident that in American parks the use of shrubs and trees with streaked and spotted or vari-colored leaves is not as profuse as it is in European parks. Perhaps, our correspondent in some afternoon drive has observed several glaring offenses against that quietness and self-restraint in planting which alone can make home grounds homelike, and this has depressed his spirits.

First and last, we have often discussed the principles which ought to underlie the art of garden design so far as it relates to the selection of trees and shrubs for some peculiarity of form or of color. It would be an affectation of severe taste to lay down a rigid and invariable rule that no plant should be used whose individuality was so pronounced that it might be called abnormal. In the hands of a skilled artist a plant with yellowish or wine-colored leaves might be used occasionally as a climax in a gradation of color. Nature herself gives a wide range to select from between the sombre tone of the dark green foliage of certain Pines and other conifers to the pallid gray of the Lead-plant, the silvery tints of the *Elæagnus* and the almost snowy leaves of our native *Hydrangea radiata* when they are disturbed by the wind so as to show their under side. There is no fear that our natural landscapes

shall ever be of that "vapid green" which is depreciated by the rhyming gardener in his well-known lines. But with all her variety nature rarely, in our northern latitude, produces variegated leaves. It is true that in the autumn we have a wealth of color in the foliage of every landscape, and as the leaves come out in spring they take on tints even more delicate and quite as remarkable in their range. But both these displays are transient. Much of their beauty consists in the fact that it is evanescent, just as our most luxuriant displays of blossoms in the flowering time of the Dogwood and Rhododendron and Judas-tree and Crab-apple clothe many a forest border with a beauty which is as profuse as it is fleeting.

These are the two real objections to the free use of plants with vivid foliage. They are unnatural, or, at least, they are alien to our climate, and they are monotonous. Nature occasionally produces a freak, but it is not in accordance with nature to multiply these oddities until they become prominent features in the landscape. A *Negundo* with pale and sickly foliage may be a chance production of nature, but nature never produced these pallid trees in such comparatively large numbers as they appear in certain European parks. Nor did any one ever see in nature such masses of purple Barberry or Golden Elder as we see in many private grounds in America. When we exalt what is rare and accidental to the place which ought to be occupied by the typical and normal vegetation of our climate, we are forcibly subverting the laws of nature and substituting devices of our own invention. It is not simply because we are introducing high colors into the landscape, for few countries in the world have scenery where abundant bright-hued flowers are more characteristic. But plants with golden leaves or variegated leaves are alien to our native silva, and when we use them in profusion we introduce a new motive altogether out of harmony with our natural landscapes.

Again, one of the characteristic beauties of an American landscape is its constant change. Between the delicate beauty of the tender leaves of our woodlands and roadside thickets in spring and their rich colors in autumn, there are new pictures every day as the foliage changes in form and color. We have meadows full of buttercups to-day, and daisies to-morrow. Our mountain slopes are now purple with the flowers of Rhododendron, and again pink with those of *Kalmias*; while from midsummer to autumn Sun-flowers and Rudbeckias, Asters and Golden-rods keep our landscapes in continued transformation. For this reason we never tire of them, as we should, perhaps, if the Rhododendrons bloomed all summer through, or if our forests from May until November presented in unvarying profusion the rich colors they show in October. And here is the fundamental defect of the trees and shrubs and plants with variegated and bright-hued foliage. It is not only that their colors are unnatural, but they are unchanging, and consequently to the last degree monotonous and wearying.

Two Southern Botanical Worthies.

COMPARATIVELY little is known of Thomas Walter, an Englishman who wrote, under the title of *Flora Caroliniana*, an account of the plants of South Carolina, where he lived and died. Many years ago Mr. H. W. Ravenel, of South Carolina, published in the Proceedings of the Elliott Society (i., 54) a transcription from the stone which marked Walter's grave in his garden on the banks of the Santee River in St. John's Parish. The stone was erected "In memory of Thomas Walter, a native of Hampshire, in England, and many years a resident of this State. He died in the beginning of the year 1788, *Ætatis* cir. 48 Ann. To a mind liberally endowed by nature, and refined by a liberal education, he added a taste for the study of Natural History, and in the department of Botany, Science is much indebted to his labors. At his desire he was buried on this spot, once the garden in which were cultivated most of the plants of his *Flora Caroliniana*,

From motives of filial affection his only surviving children, Ann and Mary, have placed this memorial."

Dr. Mellichamp, of Bluffton, South Carolina, now calls our attention to Professor Frederick A. Porcher's History and Social Sketch of Craven County, South Carolina, published in the April number of the *Southern Quarterly Review* for 1854, from which we extract the following paragraph relating to Thomas Walter:

One citizen of this parish has earned for himself a name in the world of letters, and it is strange that Ramsay, who appears eagerly to have sought after Carolinian celebrities, should have entirely ignored his existence. Thomas Walter, an English gentleman whose devotion to the cause of science led him to the wilds of Carolina, was attracted by the charms of Miss Peyre, of St. Stephens, married her and settled there. He devoted himself particularly to the pursuit of botany, and the curious are still occasionally rewarded by a visit to his garden, the ruins of which may still be seen near the banks of the Santee Canal. He is the ancestor of one branch of the Porcher family, and of the Charlton family of Georgia. His book, the *Flora Caroliniana*, which was printed in London in 1789, is dated ad Ripas Fluvii Santee, 30 Dec., 1787.

Dr. Francis Peyre Porcher, the well-known author of the *Resources of Southern Fields and Forests*, Medical, Economical and Agricultural, who died only a few months ago at a great age, was a grandson of Walter.

In this same article in the *Southern Quarterly Review* is the following note concerning Dr. James McBride, best remembered as a botanist for the assistance he gave Elliott in the preparation of his *Sketch of the Botany of South Carolina and Georgia*.

Science and humanity mourned in 1817 the untimely death of Dr. James McBride. He was a native of Sumter District, South Carolina, and was educated at Yale College, where he was a contemporary of Mr. Calhoun and of our late revered Bishop (Xtopher Gadsden). He engaged in the pursuit of medicine and, settling in Pineville, married Miss Eleanor Gourdin, daughter of The Honorable Theodore Gourdin of that village.

As a physician he was eminently successful, and he was distinguished for sound judgment and a thorough knowledge of his profession. He removed to Charleston to enter upon a wider field of practice, but before he had time to reap any of the promised fruit fell a victim to yellow fever. The opinions of Dr. McBride are treasured to this day and quoted with respect. He had an intuitive perception of truth in matters which were the subjects merely of conjecture, and subsequent researches have proved the accuracy of his judgment. His recreation was botany. He was the friend and correspondent of Elliott and assisted largely in the preparation of the *Botany of South Carolina and Georgia*. Mr. Elliott acknowledged the obligation, and in the preface of his work has paid a touching and affectionate tribute to one who richly deserved his regard, and could fully appreciate his own genius.

Notes on the Codling Moth.

NOTWITHSTANDING the fact that the codling moth is one of the oldest and best known of the apple enemies, and one which it has been supposed that we long ago knew how to control, it quietly goes on its way from year to year destroying more fruit than any other one enemy, and perhaps more than all other enemies together. It became evident a year or two ago that something was wrong in the generally accepted doctrines in regard to this insect. At the experiment station here and among growers in the state it gave much trouble, in spite of spraying as commonly advised and practiced. Accordingly, in the spring of 1896, observations were begun in the horticultural department to determine, if possible, what was the matter. Much time was spent on the subject and a good deal learned concerning the habits of the larvæ, but not all of the life-history was settled. We looked in vain for the eggs, notwithstanding the fact that large numbers of them were doubtless right before our eyes and passed by unnoticed or as having no connection with the subject in hand. This year we have been more fortunate. Through the assistance of William Nutter, of Gibbon, Nebraska, a large apple grower who has suffered great loss through the ravages of this insect, and who determined to go to the

bottom of the subject, we have been able to get large numbers of moths and eggs in profusion. Few entomologists, apparently, have detected the egg of this insect, and the old statement that it was laid in the calyx has been handed down from generation to generation of horticultural literature until Professor Washburn, of Oregon, described and figured it as found on the surface of the apple.

Instead of being laid in the calyx, we find that the eggs are laid almost exclusively on the upper surface of the leaves. Only rarely is one found on the apple or on the under side of the leaves, in the orchard, though in confinement they may be laid anywhere. At least, this has been true up to this time. It may be, however, that the later eggs, when the apples are large, may be oftener found on the apple itself. They are usually found on leaves of a cluster associated with an apple. The egg is about the size of a pin-head and looks not unlike a small drop of milk. Apparently many sterile ones are laid, or the ovule perishes for some cause. These are whiter and more shining than the fertile ones. Just before hatching, a black spot develops in the centre, which is the head of the young larva. When first hatched he is a tiny fellow about an eighth of an inch long, but as spry as a cricket. His head is then the most prominent part of him. He immediately begins to hunt for a hiding-place, and the most convenient one is often that formed by the closed calyx cup into which he enters to begin his work. About eighty per cent. of the larvæ hatched in the orchard during the early part of the season have entered by that means. If two apples hang together or if a leaf hangs over one and close against it that appears to suit them just about as well.

So much for the general habits of the insect, but how to catch it is quite another matter. The orchard on the experimental farm was in full bloom and many petals beginning to fall this year on May 6th, except the Janet, which blooms later than other varieties. Two or three days later the bloom had fallen. About May 10th, then, would have been the time to do the first spraying as ordinarily recommended. The calyx cups were watched in order to determine how long this spraying might be delayed, and still be done before they closed. The first spraying was done May 18th, but had been delayed a little too long, for many of the calyx cups were then nearly closed. Apparently the best time would have been about a week after the blossoms fell, or ten days after the time when the trees were in full bloom. This would have been about May 15th this year, our season having been later than usual. By following the sprayer I found that ordinarily we do not get the calyx thoroughly drenched. For this reason the spray was made coarser than heretofore, and this seemed to work better, particularly when applied with considerable force. It appeared to be easier to get the poison into the cavity when the lobes were wide open than when they had begun to close, making a vase-formed receptacle. The leaves increase in size very rapidly after the blossoms fall, so that on this account the sooner the spraying is done the more thorough is it likely to be. Were there no danger that the poison would be washed out by rains, the best time to apply it would be immediately after the blossoms fall. On some varieties the cup never closes, but on most kinds it was practically closed by May 20th.

But where is the codling moth? At this time, which it will be observed is about the time ordinarily recommended for spraying, there are no worms, and no eggs even. The first eggs were found in the orchard this year on June 3d, though some may have been laid a few days before that. The first larva was found June 12th, large numbers of them appearing from the 12th to the 15th, nearly a month, be it observed, after it was necessary to spray in order to get poison into the calyx cup. Very plainly, then, the success of spraying at that date depends upon getting poison into the calyx cup and having that close over it and holding it there until the larva comes. Therefore, the later the poison is applied while the calyx is still open the better.

Practical experience has proved that treatment at this time is effective. Still this is not a panacea, for if only about eighty per cent. of the worms enter at this point the remainder can abundantly people the orchard in time to get in their work on the winter fruit. What shall be done with this twenty per cent. is the question we are trying to solve; also what shall be done with the surplus moths which may drift across from the orchard of our neighbor who does not spray. Whether later sprayings, which must depend on clinging to the surface of the apple for their effectiveness, will succeed is an unsettled question. Ordinary sprays quickly run off the surface of the apple or gather in little drops, so that they do not form much protection. The addition of lime, soap or a combination with Bordeaux mixture will apparently help this some, but it is impossible to say how much. We hope to be able to answer some of these questions by the end of the season. Still, the fact that the young larva seeks for a sheltered place to begin eating may be of service, for the spray is more likely to cling about the stem or the calyx, or where another apple or a leaf touches the fruit. Another difficulty appears, however. The larger worms simply dig their way into the apple without eating, tearing out and throwing down the pieces of apple. Probably the same holds true of the small ones, which makes the fight more discouraging.

Several lines of warfare are open, however, and I am sure that some of them will prove effectual and practical. The eggs are very easily accessible, being laid as they are on the upper surface of the leaf. In a limited way in laboratory experiments we have found that kerosene emulsion will destroy these, but we are not yet able to say whether a strength that may be safely used will prove effective in field work. We are also trying Bordeaux mixture for the same purpose. Whether the pupæ can be destroyed by any caustic preparation is a question which may well be asked, though it is doubtful, because they are so well protected with their silken covering. This year the first pupa was found June 25th, and great numbers of them were to be found by the 28th. The larva turns a pinkish color when ready to enter that stage and seeks a hiding-place beneath the scales of bark or similar protected spot, not far from the ground, usually within three feet. The rough places in the forks are favorite hiding-places. Some caustic spray or wash at the right time might destroy many of these. Then, too, I believe that the old method of trapping the pupæ with bands has possibilities worth considering. Last year we were able to catch large numbers in this way. A more practical modification of this consists in cutting strips of heavy express paper on a slight curvature, folding it together once and tacking it around the tree. This makes a convenient hiding-place for the insects when ready to pupate. If the loose bark of the tree is scraped away and the trunk kept smooth and clean, these hiding-places would be largely utilized. If applied at the right time they could be left in position a week, quickly gathered up in a basket and burned and replaced by another lot. Two sets ought to answer the purpose and trap nearly all the larvæ which escape the early spraying. Unfortunately, this was overlooked at the right time this year, so that we cannot report upon that point for the first brood. The later broods come along so irregularly that we have found practically one continuous stream of them all summer long.

In confinement we find that the young larvæ eat the leaves readily, sometimes remaining on the leaf where they hatch for twenty-four hours, and eating out quite large pieces. They usually eat away one epidermis and the inner tissue, leaving the other epidermis intact. I am not yet ready to say, however, that they eat the leaves in the orchard sufficiently to make this of any importance in fighting them. We are trying to find this out.

Our experimental orchard is divided into six sections this year. One section is to receive six sprayings, one only the earlier sprayings, one only the later, etc. On June 21st a careful examination was made of trees which had

been sprayed previous to that time, as compared with unsprayed trees. The general average of all sprayed sections at that time was about five wormy apples to each tree, as against twenty-seven a tree without spraying. We find our neighbor's orchard the best hunting-ground.

Lincoln, Neb.

Fred W. Card.

Foreign Correspondence.

London Letter.

CHISWICK.—At a special meeting of the various committees of the Royal Horticultural Society, held partly as a Jubilee commemoration and partly for business, Dr. Masters, F.R.S., discoursed on the present state of the Chiswick gardens and made some suggestions for their better utilization, especially for educational purposes. Their educational value might, he said, be increased by discarding entirely all plants of passing interest or of mere decorative value and cultivating only the principal types of fruits, vegetables and flowers. The best methods of cultivation should be followed and everything possible should be done to make the collection of special interest to horticulturists. Patent and other manures should be tested and reported upon and all the now very numerous insecticides and fungicides put upon the market or recommended, chiefly by Americans, should be tried and impartially dealt with. The educational side of Chiswick might be made more of by the adoption of the Kew system with regard to young gardeners; in fact, there was good reason to hope that a plan could be devised by which Chiswick men could attend the lectures, etc., given at Kew for the benefit of the men there, and that the Kew men might enjoy the advantages of Chiswick in return. He was strongly of opinion that progress in horticulture could only come from a scientific study of the principles of horticulture. English gardeners generally worked by rule of thumb. Dr. Masters referred at some length to the experimental and teaching schools recently established in the United States, the work of which was of considerable advantage to horticulture. Sir Joseph Hooker pointed out that these experimental stations in America were state-aided, a condition of things unknown in this country. He thought the efforts being made with a view to affording more scientific training to horticulturists deserved every encouragement.

EXAMINATIONS IN HORTICULTURE.—I have already noted the annual examinations held all over the United Kingdom under the auspices of the Royal Horticultural Society. It will afford some idea of the character of these examinations if I give the questions set and the report of the examiners. The examiners are mostly young, and many of them are not horticulturists. I know that some of the most successful in the list this year know little or nothing of the practice of horticulture, while, on the other hand, some of those who have not done so well are really capable practitioners.

QUESTIONS.—ELEMENTARY PRINCIPLES.—A.

1. What are the three chief mineral ingredients of a soil? Name garden plants or shrubs which delight—each kind respectively.
2. What differences may be expected from growing unripe, perfectly ripe, and long-kept seeds respectively?
3. In transplanting, why is it necessary to preserve the extreme and most delicate tips of the root-fibrils?
4. Why does covering rhubarb reddens and lengthen the leaf-stalks and stop the growth of the blade?
5. Describe the structure of a Hyacinth bulb, and explain why the Dutch method of slashing or hollowing out the bottom induces the formation of bulbils.
6. What are the essential conditions for successful grafting?
7. How does the structure of a plum differ from that of an apple? Explain the origin of each.
8. Name the natural orders or families to which the following plants belong: Cyclamen, Rhododendron, Clematis, Stock, Pelargonium, Borage, Potato, Onion, Parsley and Turnip.

DIVISION B.—HORTICULTURAL PRACTICE.

9. Explain the process of cross-fertilization in garden flowers,

and give examples of both hardy and exotic plants that have been improved thereby.

10. After seed of the Chinese Primula has been ripened describe the method of sowing and subsequent treatment of the plants up to the period of their flowering.

11. What is the native country of the Celery-plant, and under what conditions does it grow naturally? Give a short account of its culture, such as time of sowing and subsequent treatment.

12. When and under what conditions is Sea Kale found in a wild state? Describe its culture and state the time of the year it is in use.

13. Where is the common Asparagus said to be found in a wild state? State all you know of its culture, and for how long a period it may be had in use.

14. Give an account of the Apple. How are the trees propagated? State what you know of its culture, and the diseases to which the trees are liable, and the remedies. Name one good cooking variety for use in each month from August to April inclusive.

15. State all you know about the Raspberry. What sort of soil is best adapted to its culture? Give method of training and pruning, and the best varieties to cultivate, both yellow and red.

16. Give an account of the usual method of Gooseberry-culture adopted in gardens; and also the Lancashire method to obtain prize fruit. Name six of the best prize varieties and six best for ordinary garden culture.

The examiners were the Rev. George Henslow and Mr. J. Douglas, and they have reported to the Council of the Royal Horticultural Society as follows:

We beg leave to report that we have examined the papers submitted to us—in all 184. Of these we selected 89 as worthy to be placed in the first class, 55 in the second, and 28 in the third. The remainder, 12, are not placed; the number of marks attained being below 100. These results are most encouraging. Speaking generally, the answers are extremely well done. The information is accurate upon the whole, and the subject-matter well expressed. Perhaps the practical horticulture showed, as might be anticipated, a slight superiority over the elementary principles.

A VARIEGATED PLANE.—Mr. J. Russell, nurserymen, Richmond, obtained a first-class certificate last week for a beautifully variegated variety of *Platanus acerifolia*. It was shown and certificated under the name of *P. occidentalis argentea variegata*. The young leaves when fully developed are colored a clear creamy white, or striped and flaked with that color on a green ground. Ultimately they become wholly green, so that a plant in good condition is clothed with rich green leaves, and on the young shoots either white or variegated leaves, so that at a short distance off the plant appears to be in flower. Mr. Russell says his plant is a seedling sport which originated in his nursery. It appears to be identical with *P. acerifolia*, var. *Süttneri*, which has been known and grown for at least twelve years at Kew. There used to be two large trees, said to be fifty years old, of a variegated Oriental Plane in the public park at Buda-Pesth. As grown in Mr. Russell's nursery, where the plants are perfect pyramids six feet high, this Plane is most ornamental.

PLAGIANTHUS LYALLII.—This beautiful New Zealand shrub is flowering freely at Kew this year, where it is grown against an east wall and also in the open border, the latter position being most favorable this season, probably because of the mildness of the past winter. It has thin twiggy branches, ovate cordate dark green leaves and numerous axillary clusters of pure white flowers each an inch across, and borne on a long, slender, drooping pedicel, in effect not unlike the double Cherry. Under glass we have never succeeded in flowering this plant. It appears to require a sunny, airy position sheltered from cold winds and severe frosts in winter.

London.

W. Watson.

The wild shrubs which skirt the waysides have a beauty beyond that of the cultivated exotics in spaded gardens; they cover the nakedness of stone walls with foliage and flowers; they give shelter to the birds and fruit for them, which is also a luxury to the children; they protect adjacent farm lands from winds and constitute the most interesting embellishment of a rustic farm.—*Wilson Flagg*.

New or Little-known Plants.

A New Hickory—*Hicoria pallida*.

IN its relation to the other Hickories, *Hicoria pallida* is nearer to the Nutmeg Hickory than to any other, but while the Nutmeg Hickory, *Hicoria myristicæformis*, has many characters which ally it to the Pecan and Bitternuts, this has characters which show close affinity to the White Hickory. The sterile flowers of *Hicoria pallida* are on the base of the shoot of the year, while in the Nutmeg Hickory they are from separate lateral buds as well. There are in both seven or nine rather small ovate-lanceolate leaflets which are covered on their lower surface with silvery peltate scales. In *Hicoria pallida* these scales are also found on the sterile inflorescence, covering the peduncles, bracts and calyx-lobes, on the young twigs and on the petioles, and this in the early spring gives a brilliancy to the foliage when the sunlight falls upon it that renders it very conspicuous. Although these scales are persistent on the leaves they become dulled and lose their lustre by the middle of summer. Covering the buds and young fruit and mixed with the scales on the lower surface of the leaves are resinous globules similar to those which occur on *Hicoria alba*, and which render the young foliage of that tree so fragrant. The divisions of the calyx of the pistillate flower which subtend the very large stigmatic lobes are broad and covered beneath with tufts of purplish hairs, the young fruit being like that of *Hicoria minima*, but larger. The petiole is covered with tufts of coarse yellow or brownish hairs, which add greatly to the resemblance between the foliage of this tree and that of the White Hickory, as both have about the same number of leaflets; those of the White Hickory, however, are somewhat larger and are a lighter and a brighter green.

The twigs, which are even more slender than in most forms of the Pignut, are purplish brown in color, marked with few oblong, light gray, but rather inconspicuous lenticels, and are usually smooth, although some collected in southwestern Georgia are tomentose toward the tip around the base of the terminal buds. The oval buds are sharply pointed, and are borne on an evident stipe; the lateral buds are similar to the terminal in shape and general appearance, but are somewhat smaller. The terminal are enfolded in from six to nine imbricate scales, and the lateral in from five to seven; while the number of scales in the terminal bud of the Nutmeg Hickory seldom exceeds five or six, and in the lateral bud four. Although the scales are imbricate, they lengthen but little in exfoliation. The outer are nearly glabrous on the back, but the inner are covered with a close fine pubescence. Sometimes there are coarse tufts of hair on either side of the midrib of the leaflets, but this is not always the case; whenever present it is persistent.

The fruit, as in most of the Hickories, varies much in shape and size, being sometimes almost globular, and again nearly pear-shaped, frequently assimilating forms of the Pignut or White Hickory. The usual form is subglobose, with a nut of nearly the same shape, barely apiculate at the bottom and subcordate at the top. The husk in this form is thin, less than one inch thick, and splits nearly or quite to the bottom, freeing the nut, or remains on the tree until the middle of winter without splitting at all. Another form resembles closely the pyriform fruit of the Pignut, the thin and indehiscent husk prolonged at base into a slender apophysis. The nut of this form is oblong, nearly circular in cross-section and mucronate at the base. It is seldom found over three-fourths of an inch long, and is not at all angled. In another form the fruit is nearly globular; the husk is over one-eighth of an inch thick and is wing-margined along the sutures. The nut is laterally flattened, angled, sharply pointed at both ends, and is about 1.5 inches long. The nuts of the last form resemble those of



W.W. AGNE, Del.

Fig. 39.—*Hicoria pallida*.—See page 304.

1. Fruiting twig of a typical nine-leaved form of *H. pallida*, natural size.
2. Flowering twig, showing fertile and sterile flowers and persistent bud-scales, natural size.
3. Calyx of sterile flower, enlarged.
4. Anther, enlarged.
5. A nut-form peculiar to *H. pallida*, natural size.

6. Nut split at the commissure, natural size.
- 7 and 8. Nut-form which approaches that of *H. glabra*, natural size.
- 9, 10 and 11. Nut-form which approaches that of *H. alba*, natural size.
12. Tip of twig showing winter-buds, natural size.
13. A peltate scale-scurf, magnified about twenty-five diam.

the White Hickory, and are the least common. All the nuts are white or yellowish in color, have thick hard shells and are four-celled at the base.

From its habit *Hicoria pallida* might be called the "Black Jack" of the Hickories, for it seldom exceeds forty feet in height, and is often not over eighteen or twenty, with a proportional trunk diameter of from eight to fifteen inches. The very slender upper branches are erect and closely crowded, forming a narrow, oblong crown; but the lower ones droop so low that on isolated trees their extremities are only a few feet above the ground. The trunk, too, is always short, even when the tree is growing under the most favorable conditions, most of the branches spreading from a point only fifteen or twenty feet above the foot of the trunk.

The gray bark is thick and firm, with deep and rather broad fissures separated by broad, irregularly anastomosing ridges, its general appearance being like that of the White Hickory, but rougher. In the summer, when in foliage, it bears a close resemblance to the White Hickory in all the characters which a coup d'œil can gather; in the winter the slender twigs make it more nearly resemble the Pignut. The heart-wood is brown in color; the sap-wood nearly white; and I was told by persons who had used the wood that while much inferior to the White Hickory in those properties that make good hickory, it is equally as good as that of the Bitternut. The tree, however, is too small and too infrequent to be of importance economically.

Even in the mountains of North Carolina, where I have found *Hicoria pallida* most common, it is exceedingly local, occurring at widely separated places and seldom more than a dozen trees being found at the same station. It prefers a poor, dry, soil; and I have usually found it on sandy soils, although not always.

In the mountains of Virginia and North Carolina it is associated with the Red Oak, the Rock Chestnut Oak, the Pignut and White Hickory, and ascends in the mountains of North Carolina as high as 4,000 feet above sea-level. In south-western Georgia it is found growing with the White Hickory, Post Oak, Dogwood and Long-leaved Pine on a good, loamy soil underlaid with marl and limestone. In eastern North Carolina it is found on the littoral sand dunes at Wilmington, growing with the Sand Oak, *Quercus Catesbæi*, the Spanish Oak and the Red Cedar; while near by are the Water Oak, Live Oak, Laurel Oak and Bays. On the sandstone ridges of central Tennessee it occurs with the Scrub Pine, Chestnut, and with the Oak and Rock Chestnut Oak.

Its distribution, so far as I have observed, is from southern Virginia and eastern North Carolina to middle Tennessee and south-western Georgia; but it is probably more extensively distributed and should be looked for in eastern Kentucky and northern Alabama.

This tree was first distinguished in the spring of 1895 near Chapel Hill, North Carolina, where, after two seasons' search, I have been able to locate only three specimens. The summer after distinguishing it at Chapel Hill, while examining on horseback the forests of the western portion of North Carolina in the preparation of the description of the woodland of North Carolina in Bulletin No. 6 of the North Carolina Geological Survey, I found this tree in several other places in that state. The following spring it was found in south-western Georgia and eastern North Carolina, and more recently in Tennessee. Having no good description of the Nutmeg Hickory or specimen for comparison for a long time, I considered *Hicoria pallida* to be that species, or at most a variety of it. The Nutmeg Hickory, however, does not occur in North Carolina, although indirectly credited to this state in the recently published *Nomenclature of the Arborescent Flora of the United States*.

From what is now known of it *Hicoria pallida* seems to be another localized, south Appalachian species.

North Carolina Geological Survey.

William Willard Ashe.

Cultural Department.

Border Plants.

RUDBECKIA TRILOBA, var. *Golden Glow*, is now in bloom. It is a questionable acquisition. The color is not nearly as bright as that of our double *Helianthus multiflorus*, nor is the flower as finely formed. The single form of this *Rudbeckia* is handsomer, with a ray of yellow florets and a black disk. Compared with the Sunflower, it makes a much better border plant, as it is perfectly hardy, stiff in habit and stands without stakes and has handsomely cut foliage.

Hybrid *Montbretias* are acceptable hardy plants. They are usually treated in the same way as *Gladiolus*, and the corms lifted and stored dry during winter. With no thought that they would prove hardy, a batch was left out under cover of a few leaves and Pine branches; these plants are more vigorous than those from lifted corms and bloom earlier. Just now their gracefully arching, compound spikes of scarlet and yellow flowers form part of an attractive picture, with dwarf Sunflowers for a background and *Heliotrope* for the front. Probably the late-flowering *Hemerocallis Thunbergii* could be used in place of the Sunflower with better effect, *H. fulva* in the border becomes a weed sometimes, but properly used among shrubs it is a striking plant, handsome in foliage as well as flower.

Among a number of seedling Carnations we found one with perfectly formed white flowers on long stiff stems. It came among seedlings of Mrs. Fisher, a standard florists' variety of the tree or perpetual type, but, as often happens, this variety had reverted to the border type, and for winter flowering it was useless. Pippings put in during the late summer, when rooted, boxed off and wintered in a cold frame, according to the English practice, and planted out in spring, make neat plants and bloom finely, earlier than standard varieties rooted in the winter. It is complained that we have no border varieties to compare with such as are grown on the other side, but I think if our florists who raise new varieties would save some of the reverted types, and prove them, we might get together a collection embracing all the colors.

Lobelia fulgens, var. *Victoria*, is an admirable border plant for the autumn garden. It will be strikingly effective in a week or two when the Phloxes are gone and golden colors predominate in the borders. It is remarkable for fine dark foliage and brilliant scarlet flowers. Besides being an unusually attractive border plant, *Campanula grandiflora* has the good quality of coming into bloom when nearly all other kinds are past. The variety *Mariesi* is probably the best of all, and, with its white form neatly blended, will continue for a long time. This *Campanula* is also an excellent plant for the rock garden, where now and then a taller plant varies what would otherwise be a monotonous carpet of low plants. They sow themselves quite freely. Pentstemons from seed will soon be in bloom. Those from cuttings from a few selected plants rooted last winter have been flowering for the past three weeks. They add variety at a time when the borders begin to look bare; besides, a stock of young plants in spring-time comes in handy to fill occasional bare spots.

Old plants of *Pyrethrum roseum* hybrids bloom sparingly now, and a batch of seedlings raised in winter are just coming into bloom. They will be mostly single, but showy, as bright colors prevail. *Erigeron speciosus*, with purple Aster-like flowers, is very bright. In our warm sunny climate the plant frequently exhausts itself in bloom, and should be treated as a biennial. It is easy to keep up a supply, as seeds ripen and germinate freely. In fact, it is not uncommon to find numbers of self-sown seedlings come up in the vicinity of old plants every spring. *Hypericum aureum* is a good low-growing shrubby American species. It is an excellent plant for the foreground of the mixed border where herbaceous plants are used. It is quite stiff in habit, and its flowers occur in bunches near the ends of all the branches. *Delphinium Sinense* has a much longer season of bloom than hybrids of *D. elatum*. Its deeply tinted blue flowers are scarcely equalled in intensity. *Dicentra formosa* lasts a long time in bloom, and a shady position suits it best. Here we have it behind a large rock, and it does equally well in the shade of trees if moisture enough is supplied. The delicately cut glaucous foliage and arching scapes of pink flowers resemble those of *Scilla campanulata rosea*, and contrast beautifully.

Malva moschata is exceedingly free; in fact, flowers on to exhaustion, and should be cut back when it begins to form seeds. Pink and white saucer-shaped blooms are produced in succession on short stems from the axils of the leaves. *Linaria Dalmatica*, a rather new Toadflax, with glaucous leaves and

comparatively large flowers, is not as ornamental as our roadside Butter and Eggs, *L. vulgaris*, but has the good quality of being a perennial. Masses of *Monarda didyma* are effective and sure to please those who want a border plant which will take care of itself. The whorls of red labiate flowers come near the tops of the stems and give the appearance of heads of bloom. It needs watching, or it will crowd other plants. The majestic *Veronica longifolia subsessilis*, where it succeeds, is a splendid border plant. It delights in a good deep soil, and in a situation where it is fully exposed will grow four feet high. It is the finest of all the Speedwells and the latest to bloom. *Hydrangea radiata* has little in outward appearance to suggest relation to any other *Hydrangeas* we know. It is sub-herbaceous, sending stout stems up every spring clothed with blue-green ovate leaves, downy beneath, and terminated with large flat corymbs of fertile flowers. Here and there a sterile flower may be noticed, but there are not enough of these to attract attention. In appearance the flowers resemble those of the common Elder. Here also is the true *H. paniculata*, a much stouter plant than the variety *Grandiflora* commonly seen. The light graceful panicles of the species are a relief, for it must be confessed that the big lumpy heads of the variety *Grandiflora* become a trifle wearisome in the late season, since they display themselves in almost every door-yard, although a large and well-grown plant is very showy when it stands alone with plenty of room.

Worcester, Mass.

T. D. Hatfield.

Herbaceous Perennial Plants in Flower.

LATHYRUS LATIFOLIUS, or the Everlasting Pea, should have a place in every garden where herbaceous perennials are grown. The typical plant is not as showy as some improved forms found in cultivation. Those grown here and in blossom now reach a height of five or six feet in a medium rich soil and open position. When the plants are about a foot high a few loose branches should be set about them to clamber upon. Grown in this way the flowers are produced for many weeks. These are of a dark rose color and borne in clusters of about twelve on long peduncles which measure six or nine inches in length. The variety *albus* makes a good companion, as it is similar in all its parts, but it has flowers which are of a white so pure that it may be called dazzling. The white-flowered form is rather more difficult to keep than the type, but both are invaluable for cutting purposes.

In the front row of the herbaceous border where the soil is light and in a sunny position, *Stokesia cyanea* proves itself one of the best of the showy composites of the season. It is slightly above a foot in height, branched, and the branches are terminated with bright blue flower-heads not unlike Chinese Asters. Although it is sometimes considered not quite hardy in this locality, there are plants in this garden which have been grown successfully in the borders for several years, probably because the situation and exposure are just suited to their needs.

The Wall Germander, *Teucrium Chamædrys*, is completely covered with its reddish purple flowers and makes an excellent plant for a dry, sunny position, either in the rock garden or the front row of the herbaceous border. Its flowers are produced in leafy terminal spikes and the individual flowers measure about three-fourths of an inch in length. The stems are six or eight inches high and rise from a creeping root-stock. This compact, dwarf, showy perennial comes from Europe and is quite hardy here and well worth extended cultivation. Another species of Germander grown here for some years is also worthy of notice for its showy flowers. It is known as *Teucrium Hyrcanicum*, and, although introduced into cultivation from Persia as long ago as 1763, is but little known in America. In the border the plants become twelve or fifteen inches high, and the stems are clad with ovate-cordate deeply crenated, slightly pubescent leaves. The purple flowers are in dense spikes about six inches long, and a plant with a dozen spikes or more is pleasing and effective. It enjoys a light warm soil in a sunny position. Our plants were raised from seed four years ago and have proved quite hardy without any protection in winter.

Of a large number of species of Mullein grown here the best and most satisfactory perennial among them is *Verbascum nigrum*. Another good perennial, which, however, cannot be relied upon to flower every year, is *V. Olympicum*. If this species would flower as freely as some of the other kinds it would hold first rank, and, indeed, few perennials would compare with it. On the other hand, *V. nigrum* is an exceedingly floriferous plant, and is almost constantly in flower from July until frosts destroy the blossoms. It grows about four feet high and the stems are clothed with long cordate leaves. The flowers are produced in branched racemes; the corollas are

yellow and the filaments of the stamens are covered with bright purple hairs. It grows well in any good garden soil, but does best in an open sunny position.

The Japan form of *Veronica Virginica*, which we have grown from seed obtained from the Kew Gardens two years ago, proves itself, with longer acquaintance, to be an excellent perennial. Last year the plants did not grow as tall as the type plant, our native species, but this season they are quite as tall and as vigorous. The main difference is in the time of blossoming, and the Japanese form is five or six weeks earlier than our North American plant. The best blue *Veronicas* now in blossom are *V. longifolia* and some of its varieties.

A large mass of Oswego Tea, *Monarda didyma*, is ornamental and effective grown on the lawn. The bright scarlet flowers are produced in whorls on the ends of the stems, which are about a foot and a half high. The Wild Bergamot, *Monarda fistulosa*, and some of its varieties make good border plants when grown in large clumps. The flowers of this species are purple and the stems grow slightly taller than those of *M. didyma*. *M. Bradburyana* is the neatest and most compact plant in the genus for gardening purposes. The stems are about a foot in height, terminated with pink flowers and reddish bracts. The *Monardas* are thrifty plants, increasing rapidly, and their flowering season is of long duration.

A few weeks ago, in the back row of the herbaceous border, large well-established plants of *Clematis recta* were loaded with white flowers. This plant is the best of the upright *Clematises*. It is an excellent hardy perennial, growing freely in almost any ordinary soil or situation, and is but little troubled with insects. There are a number of varieties of this species, and all are desirable garden plants. The reason for writing about it now is to recommend a late-flowering variety grown here, and known as *C. recta*, var. *umbellata*. It differs from the typical plant in having longer and narrower leaves, and its season of blossoming is two or three weeks later, thus giving us a longer blooming season of this desirable *Clematis*. *C. recta* and its varieties do best if not disturbed often. My experience with them is that after being disturbed they do not grow so strong or attain their ordinary height until the second year after transplanting.

Campanula persicifolia is an old-fashioned plant with blue flowers, but there are few new perennials that can compare with it, and it should be included in every collection of hardy herbaceous plants. There are numerous varieties, and that named *Alba grandiflora* is particularly floriferous and makes a fine display. If the flower-stems of this *Campanula* are left on the plants after they have blossomed in early summer they will produce a fairly good second crop. Our plants are now blossoming for the second time this season.

If mixed borders are backed up by shrubs, *Bocconia cordata* is effective in such a position. The individual white flowers are not very striking nor handsome, but the large terminal panicles are always effective. This Japanese plant grows with the greatest freedom and increases rapidly. The stems reach to a height of six or eight feet and are thickly set with large glaucous leaves. The desirable *Pentstemon barbatus*, var. *Torreyi*, has done remarkably well this summer. Its long, wand-like inflorescences are graceful, and the bright scarlet color of the flowers always attracts attention.

Harvard Botanic Garden, Cambridge, Mass.

Robert Cameron.

Hybridizing Caladiums.

AMONG the fancy-leaved *Caladiums* there are several varieties that are constituted so as to endure the full sunshine all day long, but most of them lack the bright coloring which gives these plants their value. The leaves are for the most part green, as, for example, *C. Wightii*, *C. Duchartrei* and *Queen Victoria*. There are a few brilliant-colored ones which do almost as well in the sun as the green kinds; three of the best are *Rossinii*, *Perle de l'Exposition* and *Uranus*, but the great majority of the showy kinds are not suited for outdoor decoration.

Some of those kinds which have done best out-of-doors for the last few years were set apart at the beginning of the season for hybridizing purposes in order to see if by crossing them a greater variety of color can be had. The operation has been a successful one so far as it has gone, and as it is exceedingly simple, a description of it might interest some fanciers of these plants. The tubers, as a rule, send up their flowers shortly after they are started into growth in the spring; large-sized tubers are very apt to flower after the first leaf is developed. The flowers are arranged on a spadix; the stamens occupy the upper portion which, when shedding their pollen, are exposed to view, but the ovaries, which occupy the lower

part of the spadix, are concealed from view by the lower half of the spathe, which is usually contracted near the middle, forming a tightly closed little chamber over the seed-bearing part. The female organs arrive at maturity in advance of the males on the same spadix by several days; there is, therefore, little danger of self-fertilization. In order to have access to the pistils it is necessary to cut an opening through the walls of the little chamber. The proper time to do this can only be judged by the size of the spathe, but if the stigmas are not ready for the pollen a delay of a day or two makes little difference, as the perfect condition of the stigmas is indicated by a viscid substance covering them. The pollen is at its best for transferring easily in the forenoon, say from ten to twelve o'clock, and at that hour, having selected the pollen-bearer, nip off the entire inflorescence. This must be done carefully, as the pollen falls off at the slightest touch, and therefore, before nipping it off, incline it so that the pollen will fall into the cavity formed by the upper part of the spathe. Then with a camel's-hair brush convey a little of the pollen to each of the stigmas, and after this is done tie up the inflorescence to a support, so that with increased weight when the seeds are ripening it will not fall over the side of the pot and break off. A hanging label is affixed with the names of both seed and pollen bearing parents. The seed is ripe in from two to three weeks; it is quite small, yellowish-white in color, and germinates in shallow pans well drained and filled to within an inch of the rim with a mixture of loam and sphagnum in equal parts rubbed through a fine sieve. The seeds were barely covered and pieces of glass were kept on during the warm part of the day to prevent a too rapid drying out. In a few days the seed leaves appear, and at this stage they look to any one not familiar with seedling *Caladiums* like young turnips, each one having a cotyledon missing. The first true leaf, however, shows the identity of the plant, although it is a trifle rounded. It is green in color, as is also the second leaf, the third showing the first indications of other colors. This occurs invariably in the middle of the leaf, being either white or dull red. This is the stage in which the seedlings are at present; they are growing in thumb-pots, three in each pot, and are a healthy-looking lot.

Botanic Garden, Washington, D. C.

G. W. Oliver.

Notes on Flowering Plants.

FORTUNATELY for the grower, few gardening operations are pressing in midsummer if the work of the early months of the year has been done systematically. But at all times success depends largely on attention to details, and some of these must be seen to now. Plants of different kinds to furnish flowers for cutting in winter are essential on a private place, and considerable management must be exercised to find room for sufficient stock in the limited space usually at command.

Roses in pots and boxes out-of-doors in preparation for winter-forcing are still growing freely, and with the abundant rains we have had in this section are likely to grow for some time to come, for it will take a considerable time to harden and ripen this sappy growth. Carnations grown out-of-doors are also liable to suffer somewhat from too much moisture, for the growth is soft and naturally more open to fungoid attacks. The plants should be closely inspected when they are being replanted under glass about a month hence. In a changeable season such as this has been the practice of growing Carnations under glass throughout the year is likely to prove the most satisfactory.

Bouvardias for cut flowers have often been deservedly noted in *GARDEN AND FOREST*. The chief point in their care at this season is frequent pinching to develop a bushy habit; the time for the last pinching depends upon the season when it is desired to have them in bloom. Planting out in a rather sandy but rich soil is decidedly better for Bouvardias than pot culture, and results in much larger and stronger plants. There is also less trouble from red spiders and other insects. But as these plants are susceptible to cold they should be brought under cover early, usually not later than the 15th of September in this locality.

Cytisus and Acacias should now be making sturdy growth outdoors in the full sunshine. They enjoy bountiful watering during bright weather, but free drainage of the pots is necessary, for all plants of this character are impatient of stagnant water at the roots. The same treatment applies to *Azalea Indica*, which should be plunged in coal ashes or other cool material for the protection of the tender roots, and have full sunshine to ripen the growth and an abundance of water to perfect the flower-buds. Peat and leaf-mold are no longer

considered absolutely necessary as the main part of the compost for *Azaleas*, so that the cost of such material and the difficulty of securing it need not deter any one from attempting their cultivation. Admirable specimens have been grown in a good fibrous loam. *Chorozemas*, *Cestrum*s and *Reinwardtias* should be included in stock useful for conservatory decoration and for cutting during winter and spring, and all of these may be grown to advantage out-of-doors through the summer. The growth thus made is short-jointed and better ripened than that of plants kept under glass the whole season. *Stevia serratifolia* and one or two of the *Eupatorium*s, notably *E. riparium* and *E. triste*, are also useful for cut flowers and require but little care. Spring-rooted cuttings potted on before the growth became stunted and finally shifted into six-inch pots are of convenient size, and after the main crop of bloom has been cut the old plants may be thrown away to make room for other plants. Plenty of water and frequent pinching to induce compact growth are the main requirements for *Stevia* and *Eupatorium*, and when the plants are plunged out-of-doors the pots should be twisted around once a week to break off any roots that push through the bottom.

Mr. Orpet's note about *Poinsettias* in a recent issue is plain and practical. I heartily agree with his method of outdoor cultivation, which produces much more stocky plants and of stronger constitution than those grown under glass continuously. *Euphorbia Jacquiniæflora* may be grown in the same way, but as this plant seems to suffer from indigestion at times, and often fails suddenly, it is probably safer to keep it indoors.

Begonias for winter cutting, of which *B. incarnata*, *B. Saundersii*, *B. rubra* and *B. nitida* are among the most useful, should be grown on in pots from spring cuttings unless a short section of bench can be spared for planting them out. The latter plan has the advantage in producing a greater quantity of bloom from a given number of plants.

Bulbs of *Lilium Harrisii* are already in the market, but the first consignments are not always the best, and unless New Year blooms are desired, it is preferable to wait a little longer for the bulbs. In any case they should be potted as soon as received, for these bulbs suffer from long exposure to the air.

Holmesburg, Pa.

W. H. Taplin.

Correspondence.

Wintering Hardy Plants in Vermont.

To the Editor of *GARDEN AND FOREST*:

Sir,—The last winter was a good one for testing the relative hardiness of all kinds of plant-life in Vermont. As a rule the coldest weather here is preceded by snow, so that the ground is well protected from the lowest degrees of cold. But last winter the coldest weather came with bare ground and it was frozen to a great depth. Many plants that had been wintered here in good condition in former years were entirely killed, while others not killed outright were so put back as to require a full season in which to recover their former strength. Many of the more tender Lilies were entirely killed when not situated in sheltered places or protected, and others which were not killed outright were so injured that the blight soon finished them. The outer scales of the bulbs of *L. auratum* were so frozen as to become rotten when thawed out in spring, and though the shoots came up and at first appeared strong as usual, they were early attacked by blight or some disease and soon succumbed. Bulbs of *L. longiflorum* and its varieties were generally killed outright, and those of *L. speciosum* were also killed where exposed to the coldest winds. In sheltered places or where covered with a mulch this species did not suffer. Our native Lilies, like *L. Canadense* and *L. superbum*, are usually among the first to be attacked with blight, except *L. candidum* and *L. excelsum*, which with me have been the first to show it. But I have noticed this year that the harder kinds, like *L. tigrinum*, *L. Canadense*, *L. superbum*, etc., have shown almost no blight, while others more tender, which in former years have been comparatively free from it, have suffered more. It is natural to conclude that the reason for this is largely due to the injury from severe cold. I am glad to state that the *L. Henryi* has proved not only quite hardy, but remarkably free from blight, and may be counted as one of the most reliable hardy Lilies. None of the Tiger varieties have shown more vigor than this.

Lilium Kramerii, which has been wintered in the ground in previous years, was wintered in soil in the cellar. It had usually been so injured by the fall rains that we tried this method, which has been a great success, for not only did nearly every bulb come through in perfect condition, but

almost all have bloomed and been much freer from blight than usual. I shall hereafter winter this bulb in this way.

Among the hardy plants *Anchusa Italica* was entirely killed where not well covered; and such species as *Bocconia cordata*, *Coronilla varia* and *Lathyrus latifolius*, Perennial Pea, were killed to a considerable depth, and though they have finally come up from a lower portion of their roots they are not of their usual size or strength. *Bocconia* was entirely killed to the depth of a foot. Below this the root had life and has come up. *Coronilla*, though a little quicker in recovering, was killed to about the same depth. *Hibiscus Moscheutos* in moist places was killed outright; in drier soil young plants survived. *Cassia Marilandica* in moist ground stood the weather, but in the same rows on a little higher ground was killed. *Aletis farinosa* was entirely killed. The upper portion of many of the roots of *Asclepias tuberosa* were killed, and though they generally come up from below they were very backward. *Bellis perennis*, which had been wintered here in previous years, though well covered, was entirely killed. *Helianthus Maximiliani* has wintered well heretofore, but not a plant has come up this season. *Helleborus purpurascens*, which had wintered in perfect order for two seasons, was about all killed, as was *H. niger*. The double Hollyhocks, as a rule, though well protected, were killed. The hardier sorts of Foxglove, such as *Digitalis grandiflora* and *D. Sibirica*, which had always been considered perfectly hardy here and which had established themselves in strong clumps well protected with a good growth of their thick leaves, were generally killed.

Ligustrum Iota has wintered here previously in good condition, but was killed outright last winter. Only now and then a plant has sprouted at all from the root. The California Privet was also badly killed back in its branches and is not so strong or promising as a year ago. The common Privet, *L. vulgare*, came through pretty well and shows little damage.

Charlotte, Vt.

F. H. Horsford.

A Plea for Zinnias.

To the Editor of GARDEN AND FOREST:

Sir,—This year my garden is without Zinnias, and their absence convinces me of their usefulness. They deserve a place in the shrubbery, where they furnish an embroidery of color during the season when few shrubs are in flower. But their chief usefulness is to furnish cut flowers from late July until frost. One hardly appreciates their range of color until one has had a large stock of them to draw upon for floral arrangements during the season. Besides the common orange-scarlet group, a packet of good mixed seed will give rosy scarlet and salmon-scarlet of different depths, almost pure orange, yellow, straw-color, deep crimson, rose, exquisitely pure pink, flesh-color and several light tints that a little child has defined as "dark white," and which, perhaps, may best be described as ivory, pale lemon and greenish white, some flowers of the latter tint being almost pure white, so that a light tone is found that will harmonize with any of the color divisions.

With such a stock of Zinnias to cut from there is always at hand the necessary basis for a bouquet, for it only needs two or three spikes of *Gladioli* in harmonizing tints, some sprays or trails of any one of the small-flowered *Clematises* or of the Cinnamon Vine, or heads of *Gypsophila paniculata*, to make an attractive and often a distinctly beautiful bouquet in any one of at least three colorings. These hardy flowers are usually available, and if the arrangement is varied by the introduction of a stalk of splendid Tiger Lilies, two or three great Golden-banded Lilies, half a dozen flowers of *Lilium speciosum*, either white or rose; Dahlias of various colors, a few belated spikes of Delphinium or some purple bells of *Cobæa scandens*, or if in an arrangement of yellow tones, a cluster of snowy Day Lilies or some sprays of showy *Salvia splendens* are added it will be seen that a succession of extremely effective bouquets will have been evolved from rather meagre materials. For throughout the three months or more that these supplemental flowers are coming into flower the Zinnias will steadily supply the foundation for the series.

Brighton, Ill.

Fanny Copley Seavey.

Recent Publications.

The Principles of Fruit-growing. By L. H. Bailey. The Macmillan Co. New York.

Professor Bailey has been preparing a monograph on the Apple, and in the course of his work it became clear that many of the essentials of the science and art of

pomology could be grouped together so as to be applicable to all kinds of fruits, and this volume is the result. Its range and purpose, therefore, is precisely defined by its title. It is a discussion of the principles which underlie the successful production of all kinds of orchard fruits, and, indeed, most of the small fruits. Probably there is more fruit consumed in the United States than in any other country of the temperate zone, and the desire for fruit is still rapidly increasing. Neither is there any country in the world where fruit is produced in such abundance, variety and excellence, and yet it is probable that fruit, in spite of an increasing demand, will grow cheaper rather than dearer. It would seem impossible that grapes, for example, can be raised profitably for a price lower than the present average, and yet in growing all kinds of fruit there must be a constant effort not only to lessen the cost of production, but to improve the quality of the product. This book is an attempt, not only to establish the laws which must be followed if the best fruit is to be grown at paying prices, but it explains the limitations of climate and of location, which make fruit-growing a hopeful industry in one region and a doubtful one in another. The study of the geography of a fruit farm with reference to markets, to threatened frosts and the conditions which make them dangerous, to winds and air currents, to atmospheric drainage and other physical conditions, is full and, of course, instructive. Equally important is the chapter on the evolution of tillage, in which such subjects as the texture of the soil—that is, its physical condition, as distinct from the amount of plant-food it contains—are treated, together with all the operations necessary for the conservation of moisture, even down to minutiae of detail. Of course, all the elementary facts which it is necessary for a fruit grower to know in relation to diseases and insects are clearly set forth, and we are glad to see that a most interesting bulletin of the Cornell Experiment Station on the general subject of spraying is largely incorporated into this chapter. Points of practice, like the laying out of grounds, the selection and setting of trees, choice of varieties, the proper methods of fertilization, with the latest methods of harvesting and marketing, are given with clearness and precision. Altogether, this is one of the best numbers of the admirable Rural Science Series, of which Professor Bailey is the general editor. Books like this go far to remove the reproach that there are no available manuals for the farm and garden in America which are at once practical in their directions and thoroughly scientific in their methods.

Notes.

Six steamers from Central America landed 115,800 bunches of bananas at this port during last week.

A correspondent of *The Gardeners' Chronicle* writes of a Scotch Pine not far from Southampton with a stem clean and handsome and measuring thirteen feet in circumference four feet from the ground. The trunk is as round as a ship's mast, and does not divide until forty feet from the ground, when it is capped by a fine round head.

At a special meeting of the New York Gardeners' Society the prizes awarded at the June exposition in the City Hall were distributed. It was decided to hold an exhibition of Cannas and other flowers in connection with the annual dinner of the society on the second Saturday of September, and to hold a Chrysanthemum show in November. Some good seedling Cannas, raised by Mr. A. L. Marshall, of Pawling, were exhibited, and one of them, a large deep crimson flower, named John B. Dutcher, received the society's certificate.

In the first volume of GARDEN AND FOREST (page 499) we gave an excellent illustration of a fruiting branch of *Elæagnus longipes*, and in the descriptive note accompanying it stated that the shrub was well worth growing "for the beauty of its fruit alone, which, moreover, is juicy and edible, with a sharp, rather pungent, agreeable flavor." We also suggested that the quality and size of the fruit might be improved by selection and become a highly esteemed dessert and culinary fruit.

We do not know that any persistent efforts have been made in this direction, but every year confirms our original belief as to its value. The shrub almost invariably yields a full crop early in July in this latitude, and its mild acid flavor is agreeable to almost every one. Indeed, many persons prefer it to the currant.

Among the choicest grapes from eastern states now seen are Delawares, and Niagaras from North Carolina; Champion, Ives and Moore's Early also come in southern shipments. Apricots in five-pound baskets are coming from the interior of this state, and Chelsea plums, in eight-pound packages, from North Carolina. Le Conte, Keiffer, Bell and Catherine are among the pears received from neighboring states. Watermelons, from Virginia and the Carolinas, and muskmelons, from Maryland, Virginia and North Carolina, are plentiful.

The current number of *Science* contains an article by Professor Bradley M. Davis describing types of plant-life in the hot springs of Yellowstone Park, and explaining in an interesting way how this minute vegetation helps to build up the deposits of various crystals. Not only do these algae aid in forming rocks, but the most beautiful sculpturing and coloring of the Mammoth Hot Springs, the peculiarities of the columns and moldings and the capitals, as well as the rich browns, olives, oranges and greens with which they are painted, are all directly due to the presence of these plants.

Lilium Henryi, which was discovered a few years ago by Dr. Henry in China, has been called the orange *Speciosum*, but really the Chinese Lily is a nobler plant, much more graceful, and only resembles *L. speciosum* in the form of its flower. Mr. A. Herrington has sent to this office a spike from Mr. Twombly's place in Madison, which is five feet high, although it is from a bulb planted last autumn. The stalk is covered with leaves throughout its entire length, and the poise of the flowers at the ends of their long slender stems gives the plant a most elegant and distinguished air.

The leading cut flowers on the street stands now are China asters and gladioli, since sweet peas have passed their prime and are rather short-stemmed. Coreopsis continues to furnish good flowers, as it has done all the summer through, being really one of the very best of plants for the production of yellow flowers. Tuberose, once the most popular of street flowers, is again occasionally seen, and seems to be growing in popularity on the east side of the town. Of course, there are always carnations and mignonette, but at no other season do the stands of the sidewalk venders show so little variety as they now do.

Seventy-six carloads of California fruits received here last week included one car of selected Valencia oranges, an unusually late shipment of this fruit. Nectarines are among the scarcer fruits from the west. Bartlett, Souvenir du Congrès, Beurre Clairgeau, Duchess and Clapp's Favorites comprise the pears in season, and the first Flame Tokay, Chasselas de Fontainebleau or Sweetwater, White Muscat of Alexandria and Thompson Seedling grapes are now offered. Bartlett pears are especially good this year, and 21,300 boxes of this fruit were sold here last week, with 17,000 boxes of peaches and 19,700 crates of plums.

The food markets of the foreign colonies have a unique interest among the more uncommon phases of life in American cities. In our own city, on turning into the foot of Mulberry Street, off the Bowery, a complete change of scene is at once realized, especially on Saturday morning. Except from children on the streets or in the popular little Mulberry Bend park, no English word is heard, and besides now and then a Chinese laundryman bent on buying some bunch onions at a close bargain, Italians only are seen. Even the experienced New York produce dealer would here find new and strange vegetables, not to speak of bread and cheese and meat in surprising shapes and sizes and colors. At this season popular favor of the buyers seems to rest with greens for salads, onions, sweet peppers, tomatoes, the unfamiliar fruits of many cucurbitaceous plants and string-beans in the order named. There are strap-leaved lettuces, true chicory leaves tied in bunches, not the endive which is usually sold here under that name, enormous leaves of Swiss chards, bunches of celery tops and of strong plants of dandelion with coarse leaves more than a foot long, tender young plants of aromatic fennel with finely dissected leaves, fresh Bee Balm, creeping thyme, marjoram, hyssop and many other unidentified plants of the Mint family. Stems of our common Mallow, with their leaves and cheeses, are recommended by the venders for infantile stomach pains. Among odd forms of the cabbage family are

stalks of cauliflower fifteen inches long, and sold for eight cents a bunch. The crinkled Savoy cabbage is much in evidence, and small heads of ordinary varieties of cabbage are measured by the quart and sold for five cents. Inferior quality is most apparent in stale eggplants, and especially in tomatoes, many of which are unfit for food. Tomatoes show the effect of the recent wet and sunless days perhaps more than any other vegetable, and the better grades now in our markets at fifteen cents a pound are of comparatively poor flavor and color, so that some idea can be had of the kind sold on Mulberry Street for two cents a pound, and these are not the poorest seen there. The economy practiced with potatoes, which are generally very small, is more reasonable, and three cents a quart is the prevailing price—less than half that asked for larger ones in better markets. On the other hand, large size counts with peppers, and immense ones sell at the rate of two for three cents. The stock is offered from push trays along the curbs and counters on the sidewalk along the house fronts, while there are occasional shops with medleys of garlic, dried leaves and herbs for flavoring, dried peas, lentils, and beans of many sizes and colors, some large brown ones being parched and encrusted with salt. Olives, black and green, and prunes and capers in oil are exposed in tubs, and an unhusked grain, some form of millet from Italy, is shown in barrel lots, at ten cents a quart. Watermelons, whole and in sections, are almost the only fruit offered here. Many of the staple vegetables come from the wholesale markets, while the salad greens and gourds are grown by the venders and by other Italian farmers in New Jersey.

Very interesting is a little bulletin of a dozen pages issued by the Agricultural Experiment Station at Berkeley, California, and giving an account of the researches of C. W. Woodworth in relation to the vine hopper. The vineyards of that state are injured in the first place by the mysterious Anaheim disease, which has so far baffled all investigation and destroys vineyard after vineyard, with nothing to arrest its progress. Then come phylloxera and the mildew, for both of which there are remedies which at least hold these ravages in check. Lastly is the vine hopper, which is not so serious in itself, but against which all remedies formerly used have proved unavailing. It seems that the life-history of this insect has hitherto not been understood. A great deal of time and money has been spent every year in attempts to destroy the eggs in winter, when, in fact, the insect does not pass the winter as an egg. Much trouble has been taken also to kill the insect in the soil, but it does not pass the winter in the ground. The vines have been sprayed in winter under the supposition that the bark is full of eggs, or that the insect is hiding beneath it, but the insect does not pass the winter on the vine. Neither does it pass the winter in fallen leaves, so that the money spent in destroying these leaves has been wasted. The fact is, that during the winter the perfect insects are feeding on all sorts of green plants, but they only take food enough to meet their present needs, so that their ravages are not noticed. It is in the spring when they begin to grow, and food is needed to produce their eggs, that the young Vine-leaves find them waiting. Spraying the leaves with poison is of no avail, for they suck the juices from the inside of the leaf with their probosces. They are small insects, it is true, and they take but little. But in the drier parts of the year they stop the growth of the leaves and kill them. There is no occasion here to give any further sketch of the history of the insect nor to quote the various remedies which have been used, together with the reasons why they have been ineffectual. Suffice it to say that in the spring-time jarring, as we treat Plum-trees in the east, is useful. A so-called hopper dozer is a contrivance similar to fly-paper, against which the insects are made to leap and stick fast, and this is also to a certain extent effective. Better still is a palm-leaf fan and a can of the sticking mixture large enough to dip it into. Skillful men working in pairs can do great execution. And finally a common conical bag-net attached to a handle is often found effective early in the morning all summer long. It is useless to try to exterminate this pest. The treatment recommended is based on the fact that a considerable number of hoppers do little injury to the crop. The problem is how to reduce their numbers below the danger-point. Whenever the Vine grower finds that these pests are appearing in dangerous numbers, if he sets his nets going at once he can probably destroy enough to save his crop at a cost of from fifteen to twenty cents an acre. If the Vine grower can develop a judgment which can be trusted as to when the insects are appearing in dangerous numbers, the net and the palm-leaf fan are the most promising means of defense against their ravages.

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The Rejuvenescence of Old Trees.

ON page 314 of this issue is the portrait of a large White Oak, possibly two centuries old, growing in the Arnold Arboretum. The top filled with dead branches and the sparse foliage show that the tree is in a decrepit condition. This was the effect of long neglect, exhausted soil, and the fact that a park road had recently been built almost at the foot of the tree. Some of its roots had been cut in excavating for the road, and the conditions of its surroundings had been changed by lowering the water-table in order to secure drainage for the road-bed. This old tree, the largest Oak in the Arboretum, appeared doomed. An attempt to save it, however, was made by pruning, and the effect of this appears in the illustration on page 315, in which the same tree is represented twelve years later. The dead wood was all cut out, the long branches shortened severely in order to increase the leaf-surface by more vigorous growth and so improve the vitality of the tree, and the ground about it was dug over and top-dressed. The result has certainly been successful, and there is no reason to doubt now that the tree will live many years longer.

This whole subject of the rejuvenescence of old trees was discussed on page 349 of our first volume, published nine years ago, and, as the subject is one of general interest, we reproduce our article with its illustration, with the remark that our experience and observation confirm the value of the system, and that while unnecessary and injudicious pruning certainly does more harm than good, old and decrepit trees can certainly be improved by practicing the De Car's system:

"The fact that old and apparently decrepit deciduous trees



Fig. 1.

can be rejuvenated by judicious pruning, is not well understood in this country, where old trees, which might, perhaps, be made to live a century or two, are often allowed to perish unnecessarily. The death of a tree can generally be traced to a gradual failing of vigor due to insufficient nourishment, or to internal decay, the result generally of neglect. The first indication of danger usually appears at the top, and when the upper branches of a tree begin to die, it is a sure indication that, unless radical measures are taken to check the trouble, it can only live a comparatively



Fig. 2.

short time. Vigor can be restored to a tree in this condition by shortening all its branches by one-third or one-half of their entire length. The only care needed in this operation is to cut back each main branch to a healthy lateral branch, which will serve to attract and elaborate, by means of its leaves, a sufficient flow of sap to insure the growth of the branch. This is essential in good pruning, and, if neglected, the end of the branch will die back to the first lateral branch or bud below the cut, leaving a point of danger to the tree. Care, too, must be taken to shorten the branches in such a way that the lowest will be the longest, that the greatest possible leaf surface may be exposed to the light. Figure 1 will serve to show how an ancient Oak should be pruned for the purpose of increasing its vigor.* The vigor of a tree depends upon the power of its leaves to elaborate plant-food. The larger the leaf surface exposed to the light, the greater will be the vigor of the tree. The object of pruning, therefore, is to increase leaf surface. If half of a branch of a decrepit tree, bearing small and scattered leaves, is cut away, the leaves which will grow upon the half which is left will be so large that their total area will often be more than double the total area of the leaves upon the whole branch before it was cut. The truth of this statement can be easily verified by cutting down to the ground in the spring a feeble seedling Oak, or, indeed, any young seedling tree, when a tall, vigorous shoot, twice the height and diameter, perhaps, of the slender stem it replaces, will appear at the end of a few months, and, although this shoot will only produce a few leaves, its greater vigor is due to the fact that a larger leaf surface is presented to the light by these few large leaves than by the more numerous smaller leaves of the original plant. The vigor, too, of a tree can be increased after it has been pruned by a good top-dressing of well-rotted manure, or of fresh soil applied over its roots; and trees growing on banks can often be benefited by deepening the soil on the lower side. A large body of plant-food can thus be supplied without burying any part of the trunk and without injury to the tree.

"The internal decay by which so many old trees perish, through inability to resist the influence of storms, is caused by dead branches allowed to remain upon the tree or from the stumps of branches left in pruning. It is an almost invariable custom in this country, when a branch is cut from the stem of a tree, to leave a stump a few inches long, as shown in Figure 2. The end of this branch, as it has no lateral shoot to insure



Fig. 3.

*We are indebted to the Trustees of the Massachusetts Society for Promoting Agriculture for permission to reproduce these figures, which are extracted from Monsieur A. de Car's work upon Tree Pruning, of which an English edition was published in 1881, by the Massachusetts Society, under the title of "A Treatise on Pruning Forest and Ornamental Trees," a work in which the whole theory of pruning is clearly explained and illustrated.

a flow of sap, is not healed over with a new formation of wood and bark, and soon dies. Decay thus begins, as appears in Figure 3, and this decay gradually extends into the interior of the trunk, as shown in Figure 4, ruining the tree for any useful purpose, and so weakening the supporting power of the stem that a severe gale will prostrate it. This decay can be prevented by cutting off dead branches as fast as they appear, and by cutting living branches, when it is necessary for any reason to remove them, close to the trunk or close to a lateral branch. The secret of good pruning lies in cutting close, so that the wound may heal by the formation of a new growth over the cut surface. No matter how large it may be necessary to make the wound, no branch stump, large or small, should be left in pruning. A coating of coal-tar applied to the wound as soon as made will serve to protect it from moisture, and will not interfere with the formation of a new layer of wood.

"Pruning, so far as the trees are concerned, can be done at any time, except in the very early spring, when they are gorged with sap and 'bleed' more freely than at other seasons of the year. The autumn, however, is found to be the best time for such work. There is more leisure now than earlier in the season, while the coating of ice which often, in this climate, covers the branches of trees in winter, makes it difficult and dangerous to work among them.

"Three men at least are needed to prune a large tree properly, and to manage the long, heavy ladders which

this operation makes necessary. One man stands at a little distance from the tree and directs where the cuts shall be made; the second man uses the saw, which must be attached often to a long handle; while the third holds one end of a rope fastened to a belt on the man in the tree, and passed over a branch above his head as a precaution against a fall. Nearly all our forest trees bear severe pruning of this sort, and improve under it. Decrepit Red,



Fig. 4.

Black, White and Swamp Oaks, Black Birches, Beeches, Hickories and Elms have been pruned in this way in the Arnold Arboretum, where many of the trees in the natural woods were perishing from pasturage and neglect. They were covered with dead branches, the foliage upon them was thin and poor, and their dying tops showed that they had but a short time to live. It was important to preserve many of these old trees until a new growth of self-sown seedlings could be brought on to replace them and a covering to the forest-floor grown. A portion of these old trees are pruned each year, and those which were operated upon first, or six or seven years ago, show, in their dense, dark-colored foliage, compact habit and vigorous growth, how pruning can, without fresh soil and without the aid of manure, put new life into feeble and dying trees.

"If often happens that when trees have grown together thickly, as in a forest, they are destitute of lower branches. When such trees are thinned, as often happens in the improvement of grounds, single specimens are left with long, straight stems, and without foliage except at the very top. Such trees, from the point of view of ornamental gardening, are ugly objects, and are, moreover, liable to blow down in the first gale.

"But there is no deciduous tree, however tall and unsightly it may be, which cannot be gradually converted into a handsome, branching specimen, by the aid of a saw and a pot of coal-tar."

MISS ABBIE A. BRADLEY, of Hingham, Massachusetts, has made a gift of \$20,000 to the President and Fellows of Harvard College, in honor of her father, William L. Bradley, the originator of the great fertilizer business which bears his name. Notwithstanding the large commercial enter-

prises in which Mr. Bradley was engaged he had an absorbing interest in trees and in tree-planting, and it is this phase of his life which his daughter has wisely determined to exemplify in the memorial. She has provided, therefore, that the income of the memorial gift is to be expended by the Director of the Arnold Arboretum at that institution for the purpose of increasing by scientific investigation the knowledge of trees. Previous gifts to the Arboretum have been made to erect buildings or for some other immediate expenditure, and this is the first endowment whose proceeds can be counted on in the interest of arboricultural science for all time to come. The form which this memorial has taken is quite as creditable to the public spirit and wisdom of Miss Bradley as the original conception is to her filial affection.

Planting for the Future.

ONE of the gravest difficulties with which the landscape-gardener has to contend is the lack of imagination in his clients. They have not the prophetic eye to see that when the débris is cleared away and the time comes to pay the bills, the finished work as it then appears is not the realized ideal of their artist, and not what they have paid for, but only the embryo of it. These clients are always well-to-do, and often wealthy. They have been accustomed to order furniture, carriages or what not, to sign a contract for building a house or a yacht, and presently the furniture or yacht is turned over to them unimprovable and complete. There are no new developments to hope for, but there are also none to wait for. There is no suspense, but there is no expectation.

The work of the landscape-gardener is essentially different. It must be waited for, and a great part of its charm to its possessor lies in the hopes he has of it. It depends principally for its means and materials on trees and shrubs and plants, things in their nature changeable, and attractive because they are changeable; things insignificant and uninteresting to the casual beholder in their beginnings, but only in their beginnings available. The designer of a landscape can boast that while the works of all other architects begin to decay from the moment of their completion, his alone begin to improve. But so few besides himself understand this that he has to wait through weary and dreary years for general appreciation and often for the appreciation of his client, whose approval is so important. This approval is important not merely from the commercial point of view, which makes it necessary that he who would sell his goods must please his customers, but from the point of view of the artist himself, who, however conscious he may be of work soundly conceived and conscientiously carried out, cannot but feel ill at ease under the dissatisfaction of his employer, though he is aware that this dissatisfaction is born of inexperience and impatience.

This difficulty, which every one who creates a design out-of doors meets in a greater or less degree, is due, as already stated, to lack of imagination. The imagination needed here is of a peculiar kind, and only the result of much training and experience. It is the faculty of perceiving how a new-created work will appear after the lapse of years, many or few. It is the faculty which enables its possessor to look at a landscape as it now is and take a mental photograph of it when the naked hills are clothed with trees, and the valleys changed from waste or farm lands to lawns or shrubberies. Any one not accustomed to this kind of exercise, who will shut his eyes and try to see clearly such alterations and developments of any scene, natural or artificial, that may meet his eye, will find how difficult is such a mental process. And it is not to be wondered at that the majority of people, even of those who are enterprising enough to face the risks and anxieties of systematic landscape-gardening, should be, in spite of themselves, disappointed with the results as they see them in their beginnings. Being without the necessary practice in looking into the future, their vision cannot be prophetic; and

to their eyes, the ill-clothed sticks that are shrubs, though shrubs ungrown, and the unfurnished poles that are trees, though trees ungrown, give no promise of the rich and scene-changing vegetation that will be evolved from these meagre twigs and branches. In a dozen years' time these Snowballs or Mock-Oranges, that now are so mean and insignificant, may fill the view with plentiful foliage and blossom, and hide unseemly objects, natural or artificial; and the new-planted trees that seem merely to deface the lawn, or stand on the hillside to make their loneliness more conspicuous, may change the entire character of the prospect and give it a breadth and dignity. But the eye of the average spectator only sees the scene of the moment, not of five or ten years hence; and after having spent thousands of dollars and endured the trouble and anxiety of seeing his place upheaved by grading, cultivating and planting, the employer of a landscape-gardener may seem to himself to have acquired little for his pains and expense beyond such as there may be of the complete and obvious work of the road-maker and mason.

This is an evil which inheres in the very nature of such work, and the weakness of human nature not to be entirely avoided. It remains for the artist to warn his employer that the work even when pronounced finished will probably seem meagre and unsatisfactory, and to encourage him to console himself by watching its yearly development and increase; he can point out that in the hopes he has of it lies a great part of his pleasure, which he will lose by giving it up to his impatience. It remains for the employer to exercise what patience he may and to enter into the views of his landscape-gardener as best he can, resting assured that as his sympathy with nature increases and his appreciation of her beauties develops he will have a keener delight in watching the growth of his plants than any other pleasure they can give. And even if at last the landscape-gardener suffers from want of immediate appreciation, he can reflect that, like all serious and conscientious workers, artists or not, he is working for the future.

Pittsburg, Pa.

H. A. Caparn.

Weeds in Southern New Jersey.

NOT a season passes but we find some weeds not before observed, and the wonder is how they reach us. This summer I found the Hare's-ear Mustard, *Conringia orientalis*, growing in my garden. This plant is so little known that it is not yet mentioned in any of our textbooks, so I was greatly puzzled over it until I saw the circular sent out by the United States Department of Agriculture entitled "Three New Weeds of the Mustard Family," and here was an excellent figure of my weed, and the mystery was solved about its presence in my garden. It must have come from the far north-west in imperfectly cleaned wheat which had been fed to chickens. The gardener had brought earth from the chicken-yard to replenish the flower border, and so this strange westerner had found a home among our familiar flowers. It is not a dangerous-looking plant, but rather attractive, as will be seen from Professor Dewey's description quoted from the circular referred to:

Hare's-ear Mustard is a rather slender branching annual, smooth and grayish throughout. The comparatively large, oval, succulent leaves suggest the popular name. The leaves at the base are broadly spatulate; those of the stem elliptical or oval, clasping at the base, and two to five inches long. The flowers are of a creamy white, about three-eighths of an inch in diameter, and produced in clusters at the extremities of the branches as in the common Mustards. Flowers are produced continuously throughout the season, and are followed by racemes of seed-pods on rather stout, spreading pedicels about half an inch long, which become separated at intervals of half an inch to one inch as the branches elongate. The seed-pods are nearly straight, about four inches long, diamond-shaped, or nearly square in transverse section, and about one-eighth of an inch in diameter. The average number of seeds borne by each pod is about fifty, and an average plant bears from forty to one hundred pods, maturing from the first of July

until the plant is killed by frost. The seeds are reddish brown, oblong, nearly flat on one side and rounded on the other, about a tenth of an inch long by one-sixteenth of an inch wide. They are large and heavy enough to pass with the grains of wheat and oats through the thrashing-machine, and, in fact, they can be completely separated from these grains only by careful manipulation with the best fanning mills or modern cleaning machines. It is practically impossible to separate them completely from flax-seed.

The peculiar foliage of the plant and its clusters of creamy white flowers entitle it to a place in the flower garden, while the crisp, tender leaves with a mild mustard flavor make very good salad. But if planted for these purposes in the garden none of its seed should be allowed to fall.

The pretty little Snapdragon, *Antirrhinum orontium*, I noticed for the first time this summer. It came from Europe many years ago and settled in Virginia around old fields and gardens, from whence it has slowly traveled until it has reached most of the Atlantic states. It is quite a handsome little plant with a pink-purple corolla which looks like the face of some animal.

A smallish composite plant, *Galinsoga parviflora*, is another weed observed for the first time this season. The small heads are about thirty-flowered, and under the microscope the achenes show rough-looking points. It commences to flower when not more than two or three inches high, and continues its growth and flowering until it is a foot or more in height and breadth. It comes from South America, and from reports of the Agricultural Department it is rapidly spreading through the eastern states.

The Bracted Plantain is another and more dreaded weed that has made its appearance here this summer. The Lance-leaved Plantain, or Ribgrass, is the worst enemy we have had to contend against on our lawns, and now if this new relative—the Bracted Plantain—is to be added to our noxious weeds, we shall have to maintain a perpetual warfare. Farmers' Bulletin, No. 28, issued by the Department of Agriculture, says that this weed has appeared in abundance in meadows, pastures and lawns in many localities from Maryland to Illinois during the past season. Although generally reported as new, it has doubtless existed before in small quantity and with less robust habit in many of these places. In some instances, however, it is known to have been introduced during the past season in lawn grass seed. An average plant is said to produce about fifteen flower-spikes, and an average spike bears about a hundred flowers or two hundred seeds, making a total of about 3,000 seeds to the plant.

Among the longest-established and best-known weeds here is the Wild Carrot. There is a law against harboring it, but, like many similar laws, it is never enforced, and so in many places it runs riot. I must confess, however, to a liking for this renegade. Its handsome white flat cymes of lace-like flowers look cool and inviting, and its foliage is handsome, too. But this cannot be said of the Wild Garlic, which is a troublesome weed in our grass lands and on our roadsides. Milk is sometimes so badly tainted with it that it is unfit for use. Like most of our noxious weeds, this, too, is a foreigner and hails from Europe. In Circular No. 9 of the United States Department of Agriculture are figures and descriptions of this vile pest, and the best methods of eradicating it, which everybody should heed. The circular states that it is the most injurious weed at the present time in the middle Atlantic states.

Among our most attractive weeds is *Galium Mollugo*, which was first observed about New York somewhere in the sixties, and is now a roadside weed, and is also found in fields and pastures. It has a deep, strong root which sends out numerous branches ending in long panicles of white fragrant flowers. The root increases in size from year to year, until one plant will cover quite a space. If it is mowed frequently it will adapt itself in a way to keep clear of the machine by sending out long flowering branches which lie flat on the ground. It is a pity that this handsome plant cannot be kept from becoming a way-faring nuisance. Our native *Galiums*, of which we have a

number of species, know their place and never encroach on our cultivated grounds.

The little foreign yellow Bedstraw, *Galium verum*, is here, too; it has numerous bright yellow flowers, and is a more slender, delicate plant than the former and can scarcely become a pest. Another handsome weed growing abundantly on our roadsides and coming into our lawns, is the

Plant Notes.

PLATYCODON MARIESII.—As recently noted in GARDEN AND FOREST, *Platycodon grandiflorum* is one of the best of the old purple garden flowers, being perfectly hardy and reliable in flowering and readily increased by seed or division of root. The white-flowered forms, which are usually



Fig. 40.—A Decrepit White Oak in the Arnold Arboretum.—See page 311.

European Hawkweed, *Hieracium aurantiacum*. It has a cluster of deep bright orange heads of flowers, and when not too abundant is a welcome sight. Its cluster of leaves lie flat on the ground below the reach of the lawn mower, and, following the example of the *Galium*, it is now forming the habit of sending out flowering shoots on the ground to escape the mower.

Vineland, N. J.

Mary Treat.

more or less flecked with purple, are even more attractive. But while in flower these plants are apt to become overweighted by their large blooms and prostrated unless staked up. On account of this drawback this species is not as satisfactory as *P. Mariesii*, which produces flowers fully as large and as attractive as those of the ordinary type on stems only a foot high. The white form of *P. Mariesii* is a handsome flower, and there are also semidouble forms of the



Fig. 41.—The same Tree Twelve Years Later.—See page 311.

same color. This *Campanula* is not as large or handsome as the *Ostrowskia magnifica*, but it is a decidedly better garden plant, as it will live and flower every season. While *Ostrowskia* may live, if conditions are to its taste,

the chances, on the whole, are rather against its flowering even after making good growth early in the year.

ANTHOLYZA CROCOSMOIDES.—This plant is said to be a hybrid between *Antholyza paniculata* and *Crocasmia*. It

is now in flower, and is, I suppose, a production of Herr Leichtlin; at least, it was distributed from the Baden-Baden garden, where it is said to have proven hardy for several winters. It is an attractive plant, flowering here at a height of about two feet. It has many of the characteristics of the Antholyza in its ribbed leaf and many-flowered stems with opposite flowers. These flowers are a bright orange-red, with yellow markings about an inch and a half broad with three inner and three outer segments and a bent tube. While not as richly colored as *C. aurea*, it is an attractive gain if it proves hardy.

NYMPHÆA LILACINA.—This hybrid Water-lily of Marliac, for which we are indebted to Mr. Brydon, who imported it a year or two ago, does not seem to have received the attention to which it is entitled, perhaps because it is still rarely seen in cultivation. Cut flowers, especially if a trifle old, as seen at exhibitions, give one a rather poor idea of the beauties of Water-lilies, which are seen at their best only in some quiet pool with a foil of crystal water. Unlike the well-known *Nymphæa Laydekeri*, which it resembles in color, *N. lilacina* may be increased by division. Its leaves are similar to the former variety, but the petals are wider and more numerous, and it has a larger array of golden stamens. It is difficult to convey an idea of the exact differences between the two hybrids without an illustration which would show them clearly. As the flower of *N. lilacina* is also larger and as bright in color and apparently as free-flowering, it seems to me that, on the whole, it is an improvement on the older variety. *N. Laydekeri*, however, is a good reliable variety, even if after five years the old plant is no larger than at first planting and has never shown a sign of increase.

Elizabeth, N. J.

J. N. Gerard.

Cultural Department.

The Fall Planting of Fruit-trees.

LAST week we gave a brief review of Professor Bailey's *Principles of Fruit-growing*, a book which we recommended to the favorable notice of all persons engaged in growing the orchard fruits especially. As a matter of timely interest we reproduce here some of the reasons why, in Professor Bailey's opinion, the autumn is generally a better time to plant fruit-trees than spring.

My opinion is that fall planting is generally preferable to spring planting upon thoroughly drained soils, particularly for the hardy-tree fruits, like Apples, Pears and Plums; and if the ground is in good condition and the stock well matured, Peaches can sometimes be set in October, even in the northern states, with success. The advantages of fall planting are several. The trees become established during the open weather of fall, and they usually make a start in spring before the ground is hard enough to allow of spring planting. This early start not only means a better growth the first season, but, what is more important, trees which get a very early hold upon the soil endure the droughts of midsummer much better than trees planted in the spring. Planting is nearly always better done in the settled weather and workable soil of fall than in the capricious days and in the hurry of spring-time; and the orchardist is free to begin cultivation at a time when he would otherwise be planting his trees. Again, it is generally better to buy trees in the fall, when the stock of varieties is full and when the best trees are yet unsold; these trees must be kept until planting-time, and it is fully as cheap and about as safe to plant them directly in the field as to heel them in until spring.

In fall planting, however, it is important to insist that trees shall be thoroughly well matured. In order to move stock quickly, it is the practice of some nurserymen to "strip" the trees before the growth is completed; that is, the leaves are stripped off, the growth stopped, and the trees are put upon the market for September deliveries. This process weakens the trees, and many failures in young plantations are probably attributable to this cause. Such trees may die outright, especially if set in the fall and a hard winter follows; or they may live to make a dwindling growth the first few years. Like early weaned calves, they lack vitality and push. If one were setting an orchard in the fall he should place his order for trees

in August or September, if possible, with the express stipulation that the trees should stand in the nursery rows until the leaves begin to die and fall. In the mean time the land should be fitted and the holes dug, so that when the trees arrive they can go directly into their places without delay or without the expense of heeling them in. Trees are mature enough to dig late in September or early in October in the northern states, depending upon the season, soil and variety. When the tree is fully matured, some of the leaves will still hold upon the vigorous shoots, and these are stripped off; but this stripping does no harm, for the young growth is then mature, and it has a thick, strong, brown appearance which is very different from the slender, soft and green branches of early stripped trees.

Plants in Flower.

VERY beautiful at this season is *Ipomœa rubro-cœrulea*, a Morning Glory which has been in cultivation for several years, and it is of that pure blue tint which almost justifies the California name of "heavenly blue." In that state it will cover a long trellis in a single season, and its flowers are more than three inches across. It is entirely different from the common Morning Glory, but if started in pots here and set out when the weather becomes warm it will bloom freely for two or three months. The seed ought not to be planted earlier than March, for plants resent any check in their growth. It is a Mexican plant.

In the hardy border *Thermopsis Caroliniana* has just passed out of bloom, and it is an excellent plant where bright yellow flowers are wanted. It is tall, and, like other leguminous plants, does better the longer its roots remain undisturbed. For this reason it is better to start it from seed or with a very small plant, for the check the large roots receive will keep it from blooming and the plant may never get to be well established. The flowers are something like those of the Lupin in form, but the foliage of the two plants is not at all alike.

An interesting little plant is *Meconopsis Cambrica*, often called the Welsh Poppy, with orange-colored flowers, two inches across, and borne something like a foot above the ground. It seems quite hardy here, but it can be grown as an annual in places where it will not endure the winter. Where a low-growing plant is needed, this Poppy can be commended. Another plant of low growth, and which when massed in a bed makes a very handsome display at this season, is *Brachycome iberidifolia*, or the Swan River Daisy. The flowers are about an inch across, but they are borne in great profusion, and are blue in color, resembling the *Cineraria* in shape. When several of these plants are grouped together in an open place they produce an admirable effect, especially when in light soil, and they keep blooming for weeks together.

A good plant to associate with our native Lilies at this season is *Pardanthus Sinensis*, often called the Blackberry Lily. Its flowers are borne at the extremity of long stems, and their bright orange color, with dark spots, makes them interesting, although they are not showy. They also harmonize admirably with the pendent white flowers of *Galtonia candicans*, and the combination is a good one to remember when providing for this particular season. *Pardanthus Sinensis* will grow from seed, and it is even said to be naturalized along some woodland walks, for it has the adaptable habit of growing well in shade.

New Haven, Conn.

R. A.

Some Good Shrubs.

THE Cornelian Cherry is a very old plant and is used to a considerable extent in park planting for its bright yellow flowers, which appear very early in the spring before the leaves; but it is good all the year through and wherever a shrub with clean foliage is needed, and already it is beginning to show its bright-colored fruits. Its botanical name, *Cornus Mas*, shows that it is connected with our native Dogwoods, which are all of them good shrubs or small trees, but, taken altogether, this Cornelian Cherry is the very best of the exotic Cornels for American planting.

Fortunately, it has become something of the fashion lately to plant the Sweet Pepper-bush of our swamps, but it is only within a few years that nurserymen have kept it on sale. It is really one of the best of our native shrubs, and if it is once set in good soil it is almost sure to live. There is a southern species, *Cornus acuminata*, and there is a variety with leaves covered with a snowy tomentum and larger flowers; but the ordinary *Clethra alnifolia* is an admirable shrub with good foliage, and at this late season when shrubs in flower are

scarce the upright racemes of pure white flowers above the glossy leaves are singularly effective. The flowers, too, are very fragrant.

The Button-bush, *Cephalanthus occidentalis*, is an inhabitant of swamps, and is often found with its roots under water. Like many other plants of this class, it does equally as well on dry ground as it does in marshy land, and while it is very beautiful in its native swamps it certainly would grace any cultivated grounds, although it might be used with good effect along the margins of brooks in company with dwarf Willows and Alders. Its flowers are arranged in perfectly spherical heads, poised gracefully at the ends of slender branchlets, and they are so full of nectar that they constantly invite the bees.

New Rochelle, N. Y.

S. A. Reed.

Correspondence.

Seasonable Notes.

To the Editor of GARDEN AND FOREST:

Sir,—In the greenhouses of B. P. Cheney, Esq., at Dover, Massachusetts, is a fine specimen of *Asparagus Sprengelii* which measures six feet in diameter. It made a fine display when in bloom recently, covered with thousands of white saucer-shaped flowers. This new plant will prove of great value to decorators, as it can be effectively used in almost any form. It can be trained into pyramidal or loose bush form, or naturally takes a graceful and drooping form. As a basket-plant its lively green is effective for relieving bright colors. It grows quite rapidly, and from a small plant in a five-inch pot this spring it has been successively shifted on as new roots formed, until now it is in a ten-inch pot. It delights in a well-enriched soil, rather light in composition, with plenty of drainage. New crowns form quickly, and, as it divides quite freely, there will soon be an abundance of it. *Adiantum Farleyense* has always succeeded well here. It is generally given a shady position in the tropical-plant house, but this is not really essential. It delights in shade, but must be near the glass. A little fire-heat is required in cool or damp weather to prevent mildew and discoloration of the fronds. There is enough here to fill one side of a large greenhouse, and it makes a beautiful bank of green. Besides good turfy loam, with a little cow manure, there are no special requirements in its cultivation.

A Japanese gentleman sent to an acquaintance in Framingham, Massachusetts, a packet of seed of the Japanese Morning Glory, and some of the plants are now in bloom on the estate of David Nevins, Esq., of that town, where they prove a great attraction. In form and color shadings the flowers resemble *Gloxinias*, and detached flowers might easily be mistaken for them.

The fine specimen of *Larix Kämpferi*, the Japanese Larch, on the grounds of H. H. Hunnewell, Esq., at Wellesley, is now carrying a heavy crop of seed-bearing cones. They are borne on the upper side of the branches. The bracts are broad, short and heavy in texture, with a comparatively open arrangement. This tree has been bearing seeds for ten years, and seedlings have been raised here and at the Bussey Institute. Seeds are planted in autumn, wintered over in a cold frame and come up in spring. Another remarkable specimen of this Larch is to be found on the estate of Mr. Probasco, a gentleman who has done much for horticulture in Cincinnati, Ohio. Mr. Probasco, when here last summer, stated that his specimen is a little the larger.

At Mrs. Cheney's place I noted a first-rate plan for Celery culture. The Celery is planted between bushed Peas of moderate height, which, during warm, dry summer weather, provide good shade. We have given up the laborious practice of digging trenches for Celery, and consider it a waste of time. To dig in a uniformly good coating of manure and draw out shallow trenches with a hoe is all the preparation we make. Except for the convenience which trenches afford for watering, we would plant on a level. Planting as we do, we can grow a crop of Lettuce, Peas, Beans or Beets between the rows, and get the crop off before it is time to earth up. With the exception of White Plume and Paris Golden, little earthing is done. The bleaching is done after the Celery is packed away, with sand between the rows, in deep pits for the winter. The claim that White Plume and Paris Golden need no bleaching is not quite just. They do require to be bleached, or they are stringy and bitter; they can, however, be prepared in half the time that ordinary kinds require. The Admiral Pea has again proved our best sort, and is the heaviest cropper I know. The flavor is equal to the well-known Champion of England. The pods are filled their entire length, and as the grains are small they maintain a good

table appearance for a long time. The Marshall and Brandywine Strawberries have done finely with us this season. It is interesting to compare notes, and it is seldom gardeners agree in their preferences; one wants the Leader, another Bubach No. 6, a third favors Eureka or Belmont, Gandy or Burnette, while yet another considers Parker's Earle without a peer. Soil and location seem to have much to do with success. Even so late in the season a good word should be said for the Emperor Forcing Lettuce. The heads are small and can be set six inches apart. Planted at the same time as Hettinger's Belmont, it is five days ahead of that variety, and in spring-time Lettuce is estimated by the heads rather than size. A row of Scarlet Runner Beans combines the ornamental with the useful, and a few of the fine scarlet pea-like flowers mixed with a bunch of Sweet Peas make a striking combination. The pods are excellent cooked as Snap Beans.

Wellesley, Mass.

T. D. Hatfield.

Periodical Literature.

The last addition to the useful *Hand-lists* of the Kew collections of living plants is devoted to tender Monocotyledons, excluding Orchideæ, which has just reached us, and forms a volume of 347 pages. In it are included lists of the Seitamineæ, Bromeliaceæ, Cape bulbs, Aloes, Yuccas, Agaves, Palms, Screw Pines, Aroids and Grasses grown under glass in the Royal Gardens. Of the Scitamineæ, including the Gingers, Arrowroot-plants and Musas, of which 450 species are known, 240 are in cultivation at Kew; almost all are natives of the tropics. In 1813 forty species were enumerated in the second edition of Aiton's *Hortus Kewensis*, and 139 before 1864, as shown in John Smith's privately printed *Records of Kew*. It may be mentioned that *Musa Ensete*, one of the best-known representatives of this family, the noble Abyssinian Banana, was introduced into cultivation at Kew from seeds sent by the British Consul at Massowah. *Strelitzia Reginae*, another well-known plant of this family, was introduced by Banks into the Royal Gardens in 1773 from the Cape of Good Hope, and another member of this genus, *Strelitzia Augusta*, was first cultivated in the gardens in 1791, when Francis Masson sent it from the Cape.

Of the Bromeliaceæ no less than 252 species are cultivated at Kew, although in 1813 only sixteen appeared in Aiton's *Hortus Kewensis*.

In Cape bulbs the Kew collection has been rich for more than a century, and now numbers twenty-eight species of Hoemodoraceæ, 221 of Irideæ, 488 of Amaryllideæ, and 512 of Liliaceæ, or a total of 1,249.

No less is the collection of so-called succulent plants—Aloes, Yuccas and Agaves—and the house devoted to the cultivation of these plants is one of the most interesting and effective in the Royal Gardens. Three hundred and seventy-seven species of these plants are enumerated in this *Hand-list*.

The history of the Palms at Kew is interesting. Eleven hundred species, nearly all natives of the tropics, have been described, and there are probably many more still remaining unknown. In 1768 six species were cultivated at Kew. In 1787 the number had risen to ten, and in 1813 to twenty. At the present time 407 species, or more than a third of all that are known to science, can be seen in a living state in the Royal Gardens. This is probably the largest assemblage of species of Palms to be found in any one place, although, of course, much larger individuals are to be seen at Buitenzorg and in other tropical gardens.

During the latter years of George the Third and in George the Fourth's reign a new Palm-house at Kew was contemplated and a piece of ground was set apart for its erection, although nothing was done about it until William the Fourth, who took much interest in improving the Royal Gardens, came to the throne. Nothing, however, was accomplished in the way of providing a proper shelter for the Kew Palms until the Royal Gardens became a public institution. The present Palm-house, the finest in the world, was completed in 1848 from the designs of Decimus Burton. The length of this structure is 362 feet; its width in the

centre 100 feet, and its height is 66 feet. The oldest Palm in the house is *Sabal Blackburniana*, from Bermuda. Originally there were two specimens of this tree in the collection, but one was taken down in 1876 for want of room. Smith, in his *Kew Records*, gives the following account of them: "On my entering Kew in the spring of 1820 the first hot house I came to was the Palm-house; on looking in I was struck with what I then considered a wonderful plant, a large-leaved Fan Palm; and I found there was another of the same kind and size at the other end of the house. There is no record of their introduction in the Garden books. Probably they formed a part of the great collection of plants introduced by Admiral Bligh in 1793, on his return home after having introduced the Bread Fruit tree into the West Indies." The large plant of *Jubœa spectabilis*, in the temperate house, is supposed to be one of several plants raised from seeds collected in Chili by Thomas Bridges and purchased from his agent in 1843.

Of the Pandanaceæ, or Screw Pine family, about 115 species are known, half of them being cultivated at Kew, mostly in the Palm-house.

Of the 900 species of Aroids known to science 368 are cultivated at Kew, the number having increased from forty-four in 1813.

Among the Grasses two of the largest species of Bamboos are noteworthy features in the centre of the Palm-house, *Bambusa vulgaris* and *Dendrocalamus giganteus*, the former having been in cultivation at Kew since the beginning of the century.

These Hand-lists are of immense assistance to cultivators. In addition to the present issue, volumes devoted to Hardy Trees and Shrubs and to Conifers have appeared, and it is to be hoped that others, enumerating the other groups of plants cultivated in this, the richest and best-managed of all gardens, will speedily appear.

Notes.

During last week 1,800 boxes of Mediterranean oranges and 36,500 boxes of lemons reached this port, and 10,700 boxes of oranges and 186,400 boxes of lemons are en route. Cool weather affects the sales of these imports quite as much as some of our domestic fruits, and prices have been unexpectedly low in the absence of a hot wave.

A correspondent of *The Gardeners' Chronicle*, in explaining his method of hybridizing *Campanulas*, mentions one point of practice that we do not remember to have seen before. In taking up the pollen from a matured anther he uses a bit of black sealing-wax drawn out to a blunt point, and when he wishes to pick up the pollen he rubs the wax on his sleeve until it becomes sufficiently electrified, and then lifts with it the loose pollen and applies it where it is desired almost without touching the flower.

How to propagate the Apple is one of those old questions which pomologists are constantly studying, and in a late illustrated bulletin of the Kansas Agricultural College, entitled "Grafting the Apple," the conclusions are reached that Apple-trees grafted on whole roots are no better than when grafted on piece roots from three to five inches in length; that there is no advantage in grafting above the crown, and that the greatest uniformity in growth is secured by using grafts that will quickly root above the union with the stalk.

Mr. F. C. Stewart, at the branch of the New York Experiment Station in Jamaica, Long Island, is studying a new bacterial disease of Sweet Corn. The plants wilt and dry up, although the leaves do not roll as they do when they die from lack of moisture. In young plants death occurs in a few days, but the disease requires from two to four weeks to run its course in older plants. Externally affected plants appear sound, but when split the fibro-vascular bundles are found gorged with a yellow substance. When a diseased stalk is cut crosswise there exudes from the ends in yellow viscid drops a substance composed of immense numbers of short bacilli. The disease may attack the plants at any stage of growth, but is the most virulent about the time when the ears are forming. It does not spread from an initial centre, but is found scattered

through the field. Diseased plants frequently occur in the same hill with healthy ones. It is found in all kinds of soil, all kinds of weather, and seems to prefer the early dwarf varieties of Sweet Corn. Mr. Stewart asks that this note be published so that he can get information concerning the geographical distribution of the disease, which seems to be common to all parts of Long Island, where in some cases it is very destructive. It has not been reported from any other section, and any one who has noticed it elsewhere will render a service to science by reporting the fact to Mr. Stewart.

The season for Bartlett pears from California is drawing to a close, and prices for this favorite fruit, which has been of unusually good quality this year, advanced twenty-five cents a box last Friday. The seventy-six car-loads of California fruits sold here last week included, besides Bartlett pears, grapes, plums and peaches, and, among many varieties, the handsome Japanese plum, Eureka, commanded the remarkably high rate of \$5.90 a crate at the wholesale auction sales. Diamond, Abundance, Purple Duane, Yellow Egg, Silver, Gros, Tragedy, Columbia, Washington, Bradshaw, Hungarian, Kelsey, German, Quackenbos and other well-known kinds ranged from eighty cents to \$2.50 a crate. Susquehanna, Late Crawford, Decker and Foster are the favorites among peaches, and Flame Tokay among grapes, with Sweetwater and Sultana as the other principal kinds in season.

Most of the late summer varieties of apples are now in market, and showy Red Astrachans and others of bright color, when hand-picked selected fruit, find ready sale at good prices. Duchess of Oldenburg is a favorite, with Gravenstein and Nyack Pippins, all of which sell at retail for from \$3.00 to \$3.35 for the best grade, while windfalls can be bought as low as \$1.00 a barrel. Peaches are still coming from Georgia and other southern states, and from Maryland, Delaware and New Jersey, and include occasional lots of large and well-colored fruit of the desirable later varieties; but most of the peaches from the eastern states are unattractive, and some are so inferior as to meet almost no demand. Bartlett pears are also comparatively poor in the eastern states, those from New Jersey bringing the highest prices. Grapes from North Carolina, while not of choice quality, have been quite plentiful, and five-pound baskets of Delawares and Niagaras sell on the street-stands for twenty cents. Damson, Wild Goose and Botan are among the eastern plums now seen. Currants continue plentiful and cheap, and there are small shipments of red raspberries from the Hudson River district, and of blackberries from that section and from New Jersey, with more abundant supplies of huckleberries from the Shawangunk mountains and from other sections of New Jersey, Maryland and Pennsylvania. Evaporated raspberries, blackberries, huckleberries, cherries, apricots and peaches of this year's crop are offered in the wholesale markets now, while the fresh fruits are yet in season.

Although it has long been known that the sweet potato contains starch in considerable quantities, the question whether it can be made a profitable source for the manufacture of starch on a commercial scale has only recently been raised. Very interesting, therefore, is a bulletin from the South Carolina Agricultural Experiment Station at Clemson College, from which it appears that at least twenty-two per cent. of starch can be counted upon in most varieties of the Sweet Potato, while in some kinds the product ranges still higher. Counting the yield of Sweet Potatoes at from 200 to 300 bushels to the acre in South Carolina, which is moderate, since 500 bushels to the acre have occasionally been accomplished, it appears that the amount of starch yielded by an acre of Sweet Potatoes is much greater than the amount yielded by Corn or Wheat, counting Corn at thirty-five bushels to the acre and Wheat at twenty bushels to the acre. That is, an acre of Sweet Potatoes will yield four times as much starch as an acre of Wheat and twice as much as an acre of Corn. The Sweet Potato even has the advantage over the Irish Potato in this regard in the southern states. Of course, this does not establish the fact that the Sweet Potato can be profitably raised as a starch producer. In the first place, a more thorough test of the quality of the starch and its fitness for sizing will have to be determined. Again, the value of the by-products is much smaller than the value of the by-products in the manufacture of starch from corn. Besides this, much must be learned about the cost of producing the sweet potato, the changes which may take place in storing it and the cost of manufacturing the starch. Nevertheless, the bulletin is an extremely interesting one, and it is full of suggestion as to the proper soils, fertilizers, etc., which the crop demands for its best development.

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The Wild Flowers of Early August.

THE early part of August is, perhaps, the least favorable time in all the verdurous months for those who like to decorate their rooms with wild flowers. Yet its resources are not to be despised, while an intelligent use of them will produce more beautiful results than the average careless gatherer can imagine. Of course, these resources vary according to climate and elevation—the seashore, the low riverland, and the mountain each furnishing its own peculiar supply. Let us see what flowers are furnished by the beautiful hill regions to the westward of New York, and how they may best be employed.

Here and there a head of Golden-rod or a slim spray of Aster may antedate the plenteous harvests to follow, but they should be picked unwillingly, for a wise decorator knows that these plants must be her chief dependence during many future weeks, and that even the most appreciative eye grows tired of too long a sequence of the same colors and forms. Variety is Nature's great resource for keeping us ever content, ever freshly delighted with her outdoor effects—variety in her stretches and touches of bright color as contrasted with the permanent green background which never fatigues the sense. And Nature's example will be imitated within doors by those among her children who really love her, for they understand that she is the best of all artistic teachers.

Thus we are brought to a fundamental fact as regards indoor decoration. Green should be chiefly relied upon when adornments on a large scale are attempted. Branches, shoots and sprays of foliage, different tints of green being selected so that absolute monotony is avoided, should be used for the corners of the hall, the landings of the staircase and that dark hollow of the unused fireplace which throws a large low jar and its verdant burden into such fine relief. Used quite by themselves, if they are large of leaf and stately in design, or relieved by one or two bold touches of color, these great bouquets of foliage are quieter and more restful in effect, usually more harmonious with the furnishings of the room, and more refreshing to the eye than any bright bunches of strong colors. This is true even at seasons which offer us floral color in the most

varied and delicate tones and most beautiful shapes. But in the first part of August, when really lovely flowers are less plentiful, a still greater reliance should be placed upon them, while small and delicate arrangements of simple green—as of little Pine and Hemlock shoots, Ferns and Grasses—are not outrivalled by any blossoms even for the adornment of the dinner-table.

Set upright against plain stretches of wall the level sprays of the Beech exceed all others in beauty, but bolder bits of Hemlock, glistening Tupelo-shoots, Hazel-boughs loaded with their green nuts, and sprays of Maple may be well employed, and, indeed, any sprays or shoots which bear their leaves, not in close clusters, but more or less individually displayed. If an enlivening touch of color is wanted early August gives it in those reddened tips of Maple, Dogwood, or Tupelo, which, while they predict the autumn, do not really show its most vivid tints or its dry and fragile textures.

At this time the most beautiful flowers of midsummer have departed. The red and yellow Lilies, the Spiræas and the Meadow Rue have followed the Laurel into their annual graves, and the late-blooming, white-flowered shrubs stand clothed in plain green again, even the Nine-bark and the New Jersey Tea. But at least one white-flowered shrub is just coming into bloom—the Clethra. It is not as graceful as most of its forerunners, and therefore is less easy to arrange within doors. Yet, if it is not massed too closely, and is intermixed with much green spray, beautiful large bouquets can be made with it, while its spicy perfume will embalm the house.

Very different is the Sumach, now showing at its best its solid flower-cones, of a lovely pale green, or the richest red. This also should not be massed, as one most often sees it, in huge formless bunches. It should be carefully displayed so that its fine fronds of foliage define themselves to the eye, while each fruit-cluster is brought out distinctly against the background they form. With no other boldly decorative plant is a warning against overabundant use more needful.

It is the same with the Thistles. Their beauty is not alone in their handsome heads. It is also in their architectural foliage and their dignity of port. Two or three standing in a very tall, narrow vase appear to much better advantage than a larger array, or than one or two combined with other plants. Neither of the yellow Gerardias—the branched form or the stiff "strict" form—can be made to look quite as well in the house as it does rising from the Fern-carpeted ground of the forest edge. Yet, separated from all other flowers, not too closely crowded, and relieved by an intermixture of green spray, either sort may produce a fine effect. The Pearly Everlasting, with its light gray-green foliage, loses its charm if it is associated with plants of a stronger color, and is apt to injure theirs. But if a bouquet formed of this plant alone is placed in a vase which does not "kill" its delicate hues, preferably in one of clear white glass, it is very individual and lovely. It is like a bouquet grown and gathered and seen by moonlight, knowing nothing of the heat and vigor of the sun.

Among the Desmodiums of the hour there is one of exceptionally delicate beauty. This is *D. acuminatum*, with large three-foliolate leaves, and rising far above them, a long and very slender stalk bearing a loose panicle of little pea-shaped blossoms of the loveliest rosy hue. Growing on the border of the woods, a cluster of these Desmodiums looks like a swarm of tiny bright pink butterflies poised at some distance from the leafy level below them. It is impossible to imitate this effect within doors, for a wide green background is needed, as well as a green mat below. The best way to employ these flowers is to discard all foliage and group a number of the flower-stalks together in a narrow-mouthed slender jar. Then they produce quite a different effect, but a delightful one, recalling certain stiff yet delicate floral traceries characteristic of Japanese art.

With the small-blossomed Sunflowers, which are now

abundant, the case is reversed. They are ragged and ungraceful in habit, and therefore look best when used to supply sparks of yellow to large bouquets of foliage. But the Spikenard, again, is attractive because of the way it bears itself, and the combination of its handsome leaves with its large panicles of minute greenish flowers. Two or three branches of this should be set by themselves and given room to spread widely as they do in growth.

Very different, again, are the arrangements which may be made in low basin-like vessels with green twining or climbing plants—Virginia Creeper and Bittersweet, for example—enlivened by slenderer lengths of the Virgin's Bower. This now bears its crop of starry white blossoms, predicting the thick clusters of long-fringed fruit which will mingle so effectively with the red and yellow foliage of a later month.

But the most abundant flowers of the early part of August are those which even their admirers consent to call weeds, and which often grow in an undeniably weedy fashion. We do not refer to the Jewel-weed, which is now in season. It is by no means weedy in habit, but it is useless to the decorator, as it quickly droops when picked. We mean the Milkweeds, the Thoroughworts, the Evening Primroses, the tall Fireweed (*Epilobium*), the ubiquitous Carrot and the other white-flowered Umbelliferæ which plentifully keep it company.

Most beautiful of these, as regards its flowers, is the despised Carrot. Weedy, indeed, is its habit, and very weedy the aspect it bestows upon the fields and roadsides which it overruns. But, closely examined, no flower in the world is more exquisite, and indoors it should be used so that its delicate countenance, not its thin, sprawling habit, is emphasized. It may be mingled, not too profusely, in a large bowl with Ferns and sprays of White Pine, so that its heads scarcely surpass the ends of their leaves. Thus displayed it is a fitting decoration for the dining-table of a princess; and also when its heads are plucked from their stems and floated close together in a flat dish—a mat of fairy lace surrounded by a border of Ferns or of Elder-leaves. The Milkweeds are hard to manage, for they are both coarse in leaf and “floppy” in port. Perhaps they look best when only a short piece of the stem is preserved and they are placed in a low flat dish, so that their soft pleasant colors and the beautiful structure of their small flowers may be observed.

As for the Thoroughworts, white and purple, they are not attractive when closely examined, but in color and in carriage they are charming. Tall arrangements of them, white and purple grouped together, may well be set in the darker corners of the house; and, for once, great quantity will not injure the quality of the effect, provided they are massed, not with their heads all on a level, but with some rising well above the others, so that their graceful dignity shall not be concealed. The yellow of Golden-rod harmonizes well with the dull purple of the Joe Pye Weed. So a few sprays of the autumnal flower may be indulged in, for, added to an arrangement of white and purple Thoroughworts, it will make a bouquet of bright yet soft color suitable to any spot, not too fully illumined, in almost any room. If the hand at work is skillful, a few Carrots or other umbelliferous plants may be added, and, perhaps, one or two small Sunflowers. Simple arrangements are safer as a rule, and this means, of course, combinations of only one or two kinds of flowers. But complex arrangements need not be altogether shunned; and it is good practice in interior decoration to gather a pile of varied Thoroughworts, of white Umbelliferæ, of Golden-rods, Asters and slim Sunflowers, and see how a couple of great vases may be filled with them, so that the general effect shall be harmonious in color and outline, while the special character of each head or spray shall be effectively brought out.

Four years ago (see vol. vi., page 301) we gave an account of the Algonquin National Park of Ontario,

and spoke with some enthusiasm of the foresight of the people of the Dominion in setting apart for public use an area of 1,300 square miles of land and 166 square miles of water. The site itself is from 1,300 to 1,400 feet above the sea-level, and there is no place in the province where so many important streams take their rise. It is a place of singular beauty, comprising a great variety of woodland and water scenery, with primeval forests, elevated lakes and streams which flow under overarching trees. Noble game, fur-bearing animals and many kinds of birds make their home here, so that as a game preserve, as a forest reservation where experiments in systematic forestry can be carried on, as a remnant of the original sylvan scenery of the country which is rapidly being desolated, as a health resort with its pure air and resinous odors, this park was a worthy conception of wise and public-spirited people, and seemed to mark an important advance in the development of Ontario.

Some letters lately published in *Forest and Stream*, of this city, make us apprehensive that the reservation is not actually administered on the lines of its original conception. It seems that much of the Pine timber is being cut, and the landscape is mutilated and defaced in a hundred ways. A delightful little lake is described which was a bit of natural loveliness, wooded to the brink with old Pines. Around it were little bays where Water Lilies grew and where deer came to eat the buds. Now the Pine is cut away, the beautiful island in the lake hardly shows a bit of verdure, a big sawmill is going up at the mouth of the river, with dams, lumber depots here and there, steamboats on the lakes, and projected railroads, so that as a breeding-ground for game much of the park is already useless. This certainly seems like desecration, and when it is added to this that many of the streams have been dammed up so as to kill the timber on their banks by drowning out the tree roots and leaving the lakes surrounded by a fringe of death, we may agree with the correspondent that Algonquin Park will soon be like “a beautiful face seared with a red-hot iron.” Of course, we have no means of verifying the facts of the case, but we sincerely trust that the men of the Dominion will remember that the making of a few hundred dollars now is a small matter when so much beauty and so much genuine utility is destroyed for all time to come.

Rosa setigera.

WE have frequently called attention to the beauty and value of the Prairie Rose as a garden plant. It has been known for a century, although gardeners are only just learning its value, and, curiously enough, no good figure of it has been published until this week, when we print on page 323 the reproduction of a drawing of flowering and fruiting branches made by Mr. Faxon in the *Arnold Arboretum*.

Rosa setigera has been described so often that it is unnecessary to do more than to refer again to its many good qualities, its hardiness and rapid growth, its freedom from the attacks of the insects which disfigure so many Roses, and the charm of its lovely pink flowers which open about the middle of July, when the flowering time of most Roses is passed.

Rosa setigera may be trained to a pillar after the fashion usually adopted for the cultivation of its better-known offsprings, the Baltimore Belle and Queen of the Prairie, but to our taste it looks the best when allowed to grow naturally, and to send out without restriction its long arching shoots, which sometimes attain the length of twelve or fifteen feet during the season, and in their second year produce many short erect lateral branches, which bear the crowded flower-clusters toward their extremities. Planted in rich soil, with a dozen feet separating it from its nearest neighbor, the Prairie Rose will grace any garden, and if several hundred plants could be used together in one great mass to cover some broad slope or steep bank in a large park, an effect of surprising beauty would be obtained;

and if in such a mass the plants were set from twelve to twenty feet apart with the ground between them carpeted with the long prostrate stems of *Rosa Wichuraiana*, which produces its fragrant white flowers when the Prairie Rose is blooming, a harmonious composition might be obtained.

Single plants of such flowering shrubs as *Rosa setigera* dotted here and there through mixed shrubberies, although in themselves beautiful, often make a plantation spotty and fail to produce the effects which might be obtained by masses of a single shrub or of two or three shrubs harmonious in form and color. The promiscuous mixing up of shrubs and trees of many countries ill-sorted in form and in the color of foliage and flower, is a common fault in most American park-planting, the result in part of a superabundance of material and in part of a want of self-restraint on the part of the planter which manifests itself in a desire to make as much show as possible without much regard for the harmony of the result. An experiment which we have suggested before of massing shrubs of the same kind together in the different parts of a large park or park system, instead of planting everywhere first a Rose, then a white-flowered *Spiræa*, then a *Forsythia*, and so on, is certainly worth a trial. Tending to secure breadth, simplicity and unity, it would at least do away with the eternal monotony of American park-planting and produce at different seasons color-effects which only the Japanese have known how to make truly effective.

Notes on the Cultivated Brassicas.

IN common with nearly all cultivated plants, especially those which are perplexing, the Brassicas have received too little attention from botanists. The inevitable outcome of such neglect or of any superficial study is a reduction of species, and in this direction Brassica has suffered greatly. It is usually confusing to reduce types. The most perplexing species in our manuals are those which contain the greatest number of old types or synonymous names. It is true that this is supposed to be primarily due to the variation of the species or groups, but I am convinced that it is often to be charged to superficial study or insufficient material. The conviction is growing upon me that our manuals contain too few rather than too many species; at all events, the miscellaneous dumping of *Ruta-bagas*, Turnips, Rape and other plants into *Brassica campestris* is unnatural, and therefore unfortunate. The best presentation of the species of true Brassicas which has yet been made is that of De Candolle's *Prodromus* so long ago as 1824, and my own studies lead me to adopt essentially those conclusions. I am not clear as to the generic merits of *Brassica* and *Sinapis*. If we are to erect generic characters upon general habit, the two might be kept apart, but I have not found structural characters with which to separate them, and for the purposes of this discussion I have kept them together. I should add that I am acquainted with no group in which many of the difficulties of classification vanish more quickly upon a study of the growing plants than in these Brassicas. From my standpoint the group may be divided as follows:

- A. Whole plant glaucous-blue when in flower; leaves of the flower-stems clasping; flowers various.
 - I. Leaves from the first more or less fleshy throughout and glaucous-blue, even when young; flowers large and creamy yellow, the petals conspicuously long-clawed and the sepals usually erect.
 1. *Brassica oleracea*, Linn., the Cabbage and Cauliflower tribe. Leaves smooth from the first, and the root never tuberous.
 2. *B. Napus*, Linn., the Rape. Leaves smooth from the first; differing from *B. oleracea* chiefly in habit and more deeply scalloped leaves. The botanical position of the Rapes is open to doubt.
 3. *B. campestris*, Linn., the *Ruta-baga*. First leaves hairy, the root usually tuberous.
 - II. Leaves (except upon the flower-stem) thin and green; flowers smaller and bright yellow, less prominently clawed.
 - a. Plant potentially biennial (that is, the root hard and thickened, often distinctly tuberous); foliage firm in texture.
 - * Leaves distinctly hairy.
 4. *B. Rapa*, Linn., the common Turnip. Leaves promi-

nently lyrate or interrupted below, the root tuberous.

** Leaves not hairy.

5. *B. Chinensis*, Linn., the Pak-Choi Cabbage. Radical leaves wavy and ample, glossy green, obovate or round, obovate in general outline, either entire or obscurely wavy or even crenate, tapering to a distinct and thick strong petiole, which is generally not prominently margined; pod large and tapering into a beak half an inch long; root sometimes tuberous.
 6. *B. napiformis*, Bailey (*Bull. 67, Cornell, 1894*), the tuberous-rooted Chinese Mustard. Radical leaves comparatively few, the blade thin and oval in outline, and on long and slender slightly feathered petioles, sharply and irregularly toothed with a thin bloom; beak of the pod more abrupt; root distinctly hard and tuberous.
 - aa. Plant truly annual; foliage profuse, loose and soft.
 7. *B. Pe-Tsai*, Bailey, l. c., the Pe-Tsai Cabbage. Numerous radical leaves, large and light green, oblong or ovate-oblong, crinkled and very veiny, and the margins wavy, contracted into a flat and ribbed petiole one to three inches wide, which is provided with a wide thin notched or wavy wing; stem leaves sessile and clasping; pod of medium size, with a short cone-like beak; the leaves tend to form an oblong, loose head, like *Cos* lettuce.
 8. *B. Japonica*, Sieb., the California Pepper Grass, Pot-herb Mustard. Rather numerous radical leaves, oblong or oblong-obovate, the margins either crisped or cut into many very fine divisions, the petiole distinct at its lower end; stem leaves all petioled; pod very small, with a slender beak; the soft, thin leaves make excellent "greens."
 - B. Plant green or but slightly glaucous when in flower; leaves on the flower-stems not prominently clasping; flowers small and yellow. (Essentially *Sinapis*.)
 9. *B. juncea*, Cosson, the Chinese Mustard.
 10. *B. nigra*, Koch, common mustard of commerce.
 11. *B. alba*, Boissier, white mustard.
- The most important innovations in this classification are the recognition of the peculiarities of the stem-leaves and the sizes and colors of the flowers; and it is to be noticed that the *Ruta-baga* and Turnip, which are ordinarily thrown together, fall into different categories. The differences between the cabbage-like species and turnip-like species in size and color of flowers is really striking when the plants are flowered side by side. The Turnip-flower is more like that of Mustard than like that of the Cabbage tribes. The breaking up of the Oriental Cabbage tribe into the three species (*B. Chinensis* proper, *B. napiformis* and *B. Pe-Tsai*) is also an innovation, but I am unable to understand the plants in any other arrangement.
- The point which I wish to urge particularly at this time is the specific distinctness of the *Ruta-baga* and Turnip, and I will contrast them more minutely. The tubers of the two are different in season, texture and flavor. In the *Ruta-baga* the small leaves immediately following the seed-leaves are sparsely hairy, but all subsequent leaves are entirely smooth, densely glaucous-blue, thick and cabbage-like, with a fleshy petiole and midrib. In the Turnip the radical leaves are always more or less hairy, and they are green and radish-like, thin, with slender petiole, and the leaves are much more lyrate, with interrupted leaflets on the petiole; the small leaves following the seed-leaves are also thinner and narrower and more deeply scalloped. In the *Ruta-baga* the flowers are large, creamy and cabbage-like, while in the Turnip they are small, yellow and mustard-like, with shorter claws and more spreading calyx. The Turnips vary in hairiness, but the cone of expanding leaves, or the "heart-leaves," always shows the hairs distinctly, while the heart-leaves of the *Ruta-bagas* are entirely smooth, fleshy, and remind one of the young shoots of Sea-kale. I have grown most of the trade varieties of *Ruta-bagas* and Turnips, and they may be referred to their respective species as follows. Specimens are in the Cornell herbarium.
- RUTA-BAGAS** (*Brassica campestris*).—1, Bronze-top Swede; 2, Burpee's Breadstone; 3, Carter's *Ruta-baga*; Carter's Imperial Hardy Swede; 5, Colson's West Norfolk; 6, Early White Vienna; 7, Improved American Purple-top *Ruta-baga*; 8, Improved Champion; 9, Improved Yellow Summer Turnip; 10, Improved Yellow Swedish; 11, Laing's Improved; 12, Lincolnshire Improved; 13, Long Island Improved Purple; 14, Long White French Turnip; 15, Shamrock; 16, Skirving's; 17, Sutton's Champion; 18, Taunton; 19, White *Ruta-baga*; 20, White Swede or Russian; 21, Yellow French.
- TURNIPS** (*Brassica Rapa*).—1, Aberdeen; 2, Black Stone; 3, Cow-horn; 4, Early Dutch Turnip; 5, Early Snowball; 6, Extra Early Milan Red-top Strap-leaf; 7, Extra Early Purple-top

Munich; 8, German Teltow; 9, Green Barrel; 10, Green Globe; 11, Grey Stone; 12, Long White Tankard; 13, Montmagny; 14, New Golden Finland; 15, Pomeranian White Globe; 16, Purple-top Strap-leaf; 17, Purple-top White Globe; 18, Red-top Globe-shaped; 19, Red-top Strap-leaf; 20, Robson's Golden Ball; 21, Seven-top; 22, Teltow, or Small Berlin; 23, True Jersey Navet; 24, White Egg; 25, White Flat, or Globe; 26, White Model; 27, White Norfolk; 28, White Strap-leaf; 29, Yellow Aberdeen; 30, Yellow Globe; 31, Yellow Malta; 32, Yellow Stone.

Brassica oleracea must be held to include, I think, all the Cabbages, Kales or Borecoles, Collards, Brussels Sprouts, and Cauliflower and Broccoli; and most botanists appear to agree that the Kohl-rabi belongs here, but upon this point I am not fully satisfied. So far as I know, *B. oleracea* is the most variable species in cultivation in temperate climates, although Naudin would give this distinction to *Cucurbita Pepo*. But the Brassica varies immensely in nearly all its parts, while the important variations of the *Cucurbitæ* are confined to the fruit and length of vine. There are few plants in which contemporary evolution can be so well studied as in this Brassica.

The Chinese Cabbages, which are now coming into cultivation, possess unusual interest to both the horticulturist and botanist. They are not only exceedingly variable, but the variations are of such a character as to show very clearly what has been the genetic history of the garden forms. The species is now represented in cultivation by several widely different forms. Hemsley refers the Chinese Cabbages to *Brassica campestris*, but they really have little in common with that much-abused species.

The confusion into which our Brassicas have fallen is in some measure due to the different vernacular names which they bear in different countries. The French use the word *chou* generically to include all forms of *B. oleracea*, and the *Ruta-baga*—that is, all the blue thick-leaved Brassicas—while in England the *Ruta-baga* is called the Swedish Turnip. A tabular view of the different vernaculars may prove to be useful:

French.	English.	American.
Chou Cabus,	Cabbage,	Cabbage.
Chou de Milan,	Savoy,	Savoy Cabbage.
Choux à Grossescotes,	Portugal Cabbage,	Portugal Cabbage.
Chou de Bruxelles,	Brussels Sprouts,	Brussels Sprouts.
Choux-verts,	Borecole or Kale,	Borecole or Kale.
Chou-rave,	Turnip Cabbage or Kohl-rabi,	Kohl-rabi.
Chou-navet,	Turnip-rooted Cabbage or Swedish Turnip,	Ruta-baga.
Chou-fleur,	Cauliflower,	Cauliflower.
Navet (or Chou-navet),	Turnip,	Turnip.
Cornell University.		L. H. Bailey.

Plant Notes.

POPULUS ALBA BOLLEANA.—It is with extreme regret that I see this handsome variety of *Populus alba* failing year by year on our grounds. At one time it was thought that it would be an exceedingly valuable shade-tree for street-planting purposes in the northern towns of Ontario. A number of trees were planted on our grounds here eight years ago. They grew with great rapidity for five or six years, and were very striking and, I may say, beautiful, when suitably situated. Out of about a dozen specimens on the grounds there is not a single healthy one to-day. The causes which have brought about this sudden decline are (1) severe winter cold without snow protection, (2) borers, (3) fungous diseases. It is difficult to say which factor has caused most injury to the trees. I am inclined to think that the order I have placed them in is probably correct. It is true that borers are exceedingly active in their attacks upon Bollé's Poplar—much more so than upon *P. alba*—and their presence seems to have a more directly injurious effect. Low temperatures cause the bark to split, branches to die off, and a general debility. Trees on sandy loam or loam and clay exhibit little differences in behavior.

Central Experimental Farm, Ottawa, Canada.

John Craig.

CROCOSMIA AUREA IMPERIALIS.—This plant has an interesting history, the variety having been evolved by selection from the type some ten years since by Herr Leichtlin. About the same time a similar variety was flowered at

Kew from some corms received from south Africa. Apparently nature and Herr Leichtlin had been working on the same lines. The production is certainly a most distinct and beautiful form of *Crocoshmia aurea*, being double the size of the type in flower. These have wide segments, are about three inches across and a tawny reddish orange color, the reverse and buds being much brighter in hue. It is much the handsomest and largest of any of the attractive family of *Tritonias* and hybrid *Montbretias*. Whether it is hardy or not I do not know. The *Montbretias* only have been tried here, but have never survived in the open. It is possible and probable that they would do so if protected from wet, as are other Cape bulbs.

Elizabeth, N. J.

J. N. Gerard.

Foreign Correspondence.

London Letter.

NEW plants were less numerous than usual at the last meeting of the Royal Horticultural Society. Orchid fanciers were specially interested in a new bigeneric hybrid of Veitchian origin, namely, *Epilaelia radico-purpurata*, the result of crossing *Epidendrum radicans* with *Laelia purpurata*, the former being the mother parent. The habit and leaf characters of the hybrid resemble the *Epidendrum*, the influence of the *Laelia* being evident only in the flowers, of which there were two, borne on the apex of a slender terminal scape. Each flower measured nearly three inches across, and the segments were rotate, the petals ovate, wider than the sepals, the lip pandurate and flat; the color was a light russet with a zone of magenta surrounding a patch of bright yellow on the lip. The plant is of greater interest to the botanist than the cultivator. Messrs. F. Sander & Co. exhibited *Angræcum Eichleri* in flower. It has an elongated or creeping stem bearing two rows of ovate leaves, while the flower is not unlike that of *A. virens*. The same firm exhibited a beautiful variety of *Vanda Hookeriana* under the name of *superba*, and a plant bearing one enormous flower of the rare *Masdevallia Gargantua*. Messrs. Low & Co. sent a plant of their new *Bulbophyllum Claptonense*, which is a near ally, if not only a form of *B. (Sarcopodium) Lobbii*.

Sedum maximum purpureum, shown by T. Ware & Son, is an extraordinary plant, exactly like the type, but wholly of a dark chocolate-purple color, almost the color of the purple beet. Although it did not obtain a certificate it is a plant that will find favor for bedding purposes. *Rosa rugosa atropurpurea* is a seedling which originated in the nursery of Mr. G. Paul. It is distinct in the small size and crinkliness of its leaves and in the rich velvety crimson color of its flowers. A hybrid *Clematis*, said to be from *Viticella* and *Integrifolia*, also from Mr. Paul, although not brilliant, is likely to find favor on account of its shrubby habit and terminal clusters of purplish pink nodding flowers two inches across. *Heliopsis Pitcheriana* received an award of merit and was much admired, the rich orange-yellow of its flowers and their substance being exceptional. A pure white-flowered *Gladiolus* of the *Gandavensis* group, and named *White Lady*, also won favor. It is among *Gladioli* what the *White Watsonia* is among *Watsonias*. Messrs. Sander & Co. exhibited an imposing group of this plant, the flower-spikes being over five feet high, copiously branched and crowded with lovely snow-white flowers. They also sent fine examples of *Lilium Henryi* and *Exacum macranthum*.

Hibiscus Syriacus coelestis, with flowers of a rich mauve-blue, and a blotched one called *Painted Lily* were awarded certificates, the blue form being greatly admired. *Veronica la Seduisante*, one of the *speciosum* section, is a beautiful variety with large erect spikes of rich purple flowers. *Eucryphia pinnatifida* was also well shown. This plant is of special value, in this country at any rate, from its habit of flowering late in July, a comparatively flowerless period so far as trees and shrubs are concerned. The



Fig. 42.—*Rosa setigera*.—See page 320.

Eucryphia is beautiful at Kew now. A bunch of flower-branches of the Spanish Broom, *Spartium junceum*, served to remind of the glory of this shrub. I lately saw some grand bushes of it at and about the railway station at Taplow, near Windsor. Indeed, the display made by this plant there is a startling revelation to any one seeing it for the first time. Taplow is the nearest railway station to Dropmore, of conifer fame.

New Tea Roses were shown by Messrs. W. Paul & Son, the best of them, to my taste, being a rich crimson well-formed flower named Francis Dubrieu, two equally striking pinks named Madame A. Chatenay and Grand Duc de Luxemburg, and a fine white named Empress Alexandra. The lovely G. Nabonnand received an award of merit. *Godetia gloriosa*, shown by Dobbie & Co., is a new variety in the way of Lady Godiva, but colored rich crimson, in effect like Crimson Rambler Rose. Sweet Pea Pink Cupid was shown by Atlee, Burpee & Co., Philadelphia.

CACTI.—We have now a National Cactus Society, composed of cultivators of Cactaceous plants, who are more numerous in England than formerly. The society's annual exhibition was held this week at Westminster, and, although the muster of plants was not large, it was most creditable, the collections generally showing good cultivation. Cacti will stand rough treatment better than most plants, but not without showing it, and careful cultivators who appreciate Cacti keep them well groomed, so that none of their attractions are sacrificed. The difference between a carefully grown plant and a roughly used one of such as *Pilocereus senilis*, *Echinocactus Grussoni*, *E. Wislizeni*, etc., is most marked. Phyllocacti, under the careful cultivation of Messrs. J. Veitch & Sons, are very much superior as garden plants to what one usually sees. I call attention to this matter because collectors and packers of these plants in the United States, the source of most of them, appear to be careless of bruising them. I have seen collections of them arrive in England in a most deplorable state from this cause. The Secretary of the National Cactus Society is Mr. C. A. Blogg, Brighton Road, Croydon. Messrs. Cannell & Sons are the only nurserymen who stock a collection of Cacti here.

CRINUM WOODROWI, BAKER.—This new species has lately flowered at Kew, whither it was sent a few months ago by Mr. Woodrow, of Poona, Bombay. It has a large ovate, smooth-skinned, brown bulb, without any distinct neck, and broad glaucous leaves not unlike those of *Crinum giganteum*, and a stout scape two feet high bearing an umbel of about a dozen flowers, which have an erect slender greenish tube four inches long and narrow oblanceolate, pure white segments, elegantly recurved, and of the same length as the tube. The stamens are about half as long as the segments. The bulbs were sent for *C. brachynema*, which is peculiar to the Bombay Presidency, but which is distinct from the new one in its narrower leaves and smaller flowers, and differs from all other *Crinums* in having stamens no longer than the tube—that is, the flowers are thrum-eyed. It is a handsome garden *Crinum*. A figure of it will shortly appear in *The Botanical Magazine*.

Kew HAND-LISTS.—A list of all the tender Monocotyledons cultivated at Kew is the most recent publication emanating from the Royal Gardens. It includes all except Orchideæ, of which a separate list was published last year, and consequently large groups of plants of more or less garden interest are enumerated; that is, *Scitamineæ* (Gingerworts, Musas, etc.); *Bromeliaceæ*, of which Kew possesses over 250 species; *Liliaceæ*, *Amaryllideæ* and *Irideæ*, among which are many of those plants popularly known as Cape bulbs, Aloes, Agaves, etc.; *Palmæ*, no less than 400 species of this order being in cultivation at Kew; *Aroideæ*, which are nearly as well represented as the Palms; *Pandanads* and *Bamboos*. So far as cultivated plants are concerned, these Kew Hand-lists are more trustworthy in regard to nomenclature than the *Kew Index*, the latter great work being an index to the names that have been given to plants

rather than a critical revision of them, whereas the names used in these lists are in almost all cases those which Kew has decided to adopt. It is intended to eventually accomplish a complete enumeration of all the plants cultivated at Kew, and this means practically all plants that are capable of cultivation in England both out-of-doors and under glass.

London.

W. Watson.

Cultural Department.

The Vegetable Garden.

THIS summer is characterized by a great deal of sunless weather, and the rainfall has been several inches above the average. Artificial watering has been unnecessary throughout the season, and the frequent and copious drenchings of the ground and the luxuriant growth of the plants have made it difficult to keep the weeds in check. Hoeing and cultivating of the wet soil has not been possible, and a good deal of hand weeding has been necessary to keep the vegetable-beds clean. When any hoeing is done all weeds should be raked off the same day and wheeled away to the rubbish pile. Some kinds are hard to kill, as Purslane and Chickweed.

Most vegetables have done well this season, excepting Sweet Corn and Tomatoes. The former has been later than usual in maturing and lacks flavor, and high winds and rains broke down the stalks about the middle of July. Tomatoes thus far have ripened slowly and cracked badly, and those lying on the ground have a poor chance to color at all. The plants trained on trellises or poles need to be looked over once a week and to have surplus laterals and decaying foliage cut away and any leaves which keep the sunlight from reaching the fruit. Good sorts tried this year for the first time are New Imperial, Honor Bright and Autocrat. Plants for family purposes to fruit from November onward are now quite stocky in four-inch pots. At present we grow in the open air, and will do so until the middle of September. A pinch of seed sown now will give ripe fruit early in January.

All members of the Brassica family are doing finely this season, and no better weather could be wished for them. Late plantings of Savoy Cabbage and Curled Borecole are still seasonable, and both will give nice heads for cutting. Cauliflowers are benefited by a soaking of guano or cow-manure water after a heavy rainfall; the ground should be stirred whenever it dries out sufficiently. Squashes are doing specially well. If the ground is heavy and retentive of moisture it is a good plan to lay a piece of slate or a shingle under the fruit; this may also be done with Melons, which are now setting and swelling an extra-good crop, but need some hot dry weather to ripen them and give them the proper flavor. Eggplants still need constant watching from the attacks of potato-bugs, and they are greatly benefited by a scattering of chemical fertilizer or a soaking of strong liquid-manure. Onions will soon be sufficiently ripened to pull up and dry; the hoe is worked through them frequently, and any weeds near the bulbs are carefully picked out by hand. No vegetable better repays extra attention than Onions. To produce the finest bulbs liquid-manure is necessary, and the bulbs of plants treated with it are double the size of those not receiving any fertilizer or manure-water at all. The best bulbs are those of Prizetaker, Ailsa Craig and Cranston's Excelsior. All these are sound, good-keeping sorts.

We sow Lettuce until the end of September. Ground vacated by Onions toward the end of the month will give good heads before winter. We find Deacon, New York, Sutton's Cabbage, Salamander and Big Boston excellent varieties for late sowings. To winter in frames we still find nothing better than White Tennis Ball. A last sowing of Endive is also now seasonable; plants of earlier sowings will need tying up loosely by the tips of the cone-shaped leaves to blanch. Radishes may be sown for several weeks yet, those of the French Breakfast type being preferable. This is a good time to make a late sowing of Purple-top Munich or White Globe Turnip, as well as of Ruta-bagas. About September 1st is as early as we generally sow Prickly Spinach to stand out in winter.

Celery has reveled in the recent moist weather and is growing luxuriantly. Most of its growth will be made, however, between now and the end of September. The earliest batch is being blanched by means of boards, which is a superior method to earthing up with soil, as is done with the winter supply. Celery is a gross-feeding plant, and after heavy rain-falls a few barrels of liquid-manure water will materially improve the plants. So far we have seen no signs of leaf-rust, but this is more likely to appear when cooler nights with

heavy dews are succeeded by hot bright days. We go through the benches as soon as the ground dries sufficiently after watering and lightly stir the surface soil. It is unwise to stir it to any depth, as, owing to the moist summer, the roots are nearer to the surface than usual. This applies to many other plants as well as to Celery. Leeks enjoy similar treatment to that given to Celery, and doses of liquid-manure of good strength are now given them once a week.

Cucumbers need to have all ripe fruit removed to keep the plants in good bearing condition. Plants of the English frame section under glass take large supplies of water and frequent doses of stimulants, and require some shade, such as white-wash on the glass. Parsley, if grown to be lifted for a winter supply, should be thinned out to a foot apart, the best-curved plants being selected for the purpose.

It will soon be time to collect manure for the early Mushroom bed. Sometimes in the rush of spring and early summer work the old beds are not cleared off; wet days should be taken advantage of to do this work, and the old material is useful for mulching as well as for mixing with loam for bedding plants, or for lightening up heavy land.

Taunton, Mass.

W. N. Craig.

Some Hardy Perennial Plants.

THE genus *Echinops*, or Globe Thistle, is not a very large one, but it contains a few species that are worthy of a place in our gardens. They are perfectly hardy and grow and thrive in any good garden soil, but for the best effects they ought to be massed near some bright yellow flowers, such as the early Sunflowers, when their globular heads show to better advantage. One of the species in bloom now is *E. comutatus*, often found under the name *exaltatus*. It is a vigorous-growing plant, and reaches to a height of five or six feet or more. The stems terminate with large, round whitish flower-heads, which are quite conspicuous, and are well clothed with large pinnatifid thistle-like leaves, downy beneath and rough with hairs on the upper side, and margined with small sharp spines.

Bees are especially fond of the flowers of this plant, and it would seem to be a useful plant for those who have an apiary. Probably the best species in blossom now is *Echinops Ritro*. This desirable plant is an old-time inhabitant of gardens and is a native of the south of Europe. It never attains much more than three feet in height. The intense blue round flower-heads are always attractive and noticeable. The leaves are also pinnatifid and downy beneath. The neat compact habit of this attractive species makes it a desirable border plant. Another species of desirable habit is *E. sphærocephalus*; it grows from three to four feet high and has pale blue flower-heads. The Globe Thistles produce seeds abundantly, and young stock is easily obtained from seed, or the plants can be readily increased by division.

The Sea Hollies, or *Eryngiums*, are umbelliferous plants and are remarkably distinct from any other plants in bloom now. Some are quite hardy and are especially attractive and handsome for the beautiful blue of the stems and leaves. *E. amethystinum*, as it is grown here, is slightly over two feet in height, and bears amethyst-colored flowers in globose heads abundantly. In an open, sunny position it makes a handsome border plant. Another vigorous species, and which grows slightly taller, is *E. giganteum*. It is much-branched and the blue flower-heads are ovate in shape. Other equally handsome species now in bloom are *E. dichotomum*, *E. Bourgati* and *E. campestre*.

Podophyllum Emodi, a desirable hardy herbaceous plant from the Himalayas, is comparatively rare in cultivation. This interesting plant belongs to the Barberry family. When in bloom it is quite ornamental, but attracts most attention when its large ellipsoid scarlet fruits are ripening. I exhibited a few weeks ago some fruits, with the leaves and stems attached, at a Saturday exhibition of the Massachusetts Horticultural Society, and a first-class certificate of merit was awarded. The plant is quite hardy here and grows in slightly moist and shaded positions. The plant from which the fruits were taken was raised from seed four years ago. The herbaceous stem is about a foot in height, has two orbicular leaves which measure six to nine inches across and have from three to five lobes. The cup-shaped white flowers are solitary, axillary, or slightly raised above the axils, nodding, and measure slightly more than one inch in length. *Nicholson's Dictionary of Gardening*, *Robinson's English Flower Garden*, Hooker and Thomson's *Flora Indica* all give the measurement of the fruit as from one to two inches long. The fruits on our plant measure three and a half inches in length and slightly more

than six in circumference. Hooker and Thomson in their *Flora Indica* state that *Podophyllum Emodi* is a remarkable plant and one of the earliest spring flowers in the Himalayas, and that the pulpy, tasteless fruits are edible.

Harvard Botanic Garden, Cambridge, Mass.

Robert Cameron.

Seasonable Suggestions.

ALL bulbous plants that have been at rest during the early summer should now be looked over, as it is time to pot most of them. We are now putting all the stock of *Freesias* into pots and pans. They will soon begin to make roots if potted, and they never can be in flower too early. It requires early potting and good culture to get *Freesias* in bloom by Christmas. It is almost impossible to have the soil too rich for these bulbs, and to have really good flowers liberal supplies of liquid-food is necessary after they have begun to grow. We prefer to grow them in pots or deep pans, as they are available then for house decoration. But the best plan, where cut flowers only are required, is to put the bulbs in boxes, and when the shoots are well up to place short twigs of birch between them to keep them erect. We box all small bulbs to grow on to flowering size when it is needed to add to the stock of this fine winter-flowering bulb.

Lachenalias need potting at this time also. They come from the same country, south Africa, and have been at rest for the last three months in the pots in which they grew. It will be found on examination that there are signs of root-action starting, and the sooner the bulbs are put in new soil and given moisture the better will be the results. There seems to be a growing liking for *Lachenalias*, and there are some fine varieties now in commerce, the result of crossing the various species. If it is desired to purchase *Lachenalias*, it is wise to order early. The Dutch growers last year could not supply many of the kinds, the demand being larger than the supply, especially of the larger-flowered varieties of recent origin. We find that *L. pendula* makes a fine companion plant for the Roman Hyacinth; it flowers at the same time of year, and adds variety to the prevailing white of the Hyacinths. *Lachenalias* can be grown in the coolest of houses; they are averse to heat in every case, and a shelf in a Violet-house, where they can be free from frost and have plenty of air, are conditions they delight in. *Lachenalias* make the best display when potted in five-inch pots. We have had them in pans, but to see them and use them to the best advantage pots are preferable, filled with rich soil. When planted they should be placed in a cool frame until frost comes, when they may be removed to the greenhouse.

To have Roman Hyacinths early we must plant early; in fact, as soon as it is possible to obtain the bulbs. The largest bulbs do not always produce the most flowers, but, preferably, those that are hard and well matured. It is the custom with some growers to rush the crop of bulbs on the market to secure early sales at the risk of maturity. This can be easily detected in the bulb, as it is then not hard and shows signs of premature ripening off at the crown. These delicate and fragrant flowers are in demand as early as Thanksgiving-time, and the bulbs should be planted as soon as they can be obtained.

Mignonette is desirable in winter, especially as it is never seen to so good advantage as when well cultivated in a house with a suitable temperature. Our summers are much too hot to favor the growth of good spikes, and it is well to sow some seeds of an approved strain now to have it when flowers are most scarce, just when *Chrysanthemums* are past. *Mignonette* likes a cool temperature, say a maximum of fifty degrees, such as a Violet-house will furnish, and a deep soil. A bench at least a foot deep is best, and though this may seem a great deal of soil, we find it is useful in spring, when hot-beds are being made up for early vegetables, to have the soil from the old spent *Mignonette* beds ready to hand already warm and in condition for sowing seeds or transplanting vegetables. There are many good strains of *Mignonette* now, as Allen's Defiance and Sutton's Giant. We have grown the latter for a number of years and it never has disappointed us. Both these kinds seem to be fine selections from Machet, which is the best for outdoor culture.

A word may be said for *Browallia speciosa major*, which has proved desirable for pot culture in winter. The older *Browallias* were small-flowered in comparison with this variety, and not very desirable garden plants, but this novelty has all the qualities that go to make a good winter-flowering plant, either for use in pots or as cut flowers. A packet of seeds sown now will make nice plants for winter use and will flower along until late spring.

South Lancaster, Mass.

E. O. Orpet.

The Annual Species of *Coreopsis*.

COREOPSIS is a genus of common American plants, of which no less than seventeen species are found widely distributed through the Mississippi Valley and the southern states. Plants of this genus are thrifty, vigorous growers, generally hardy, and when cultivated do not demand the care required by many delicate species. This genus does not appear to have received much attention from American gardeners, and our seedsmen have heretofore offered few named varieties, but in Europe, where the plant is not indigenous, it is deservedly popular and many varieties have been bred and offered.

The larger number of the species are annuals, but some are biennials or perennials. In this northern climate the seed should be sown under glass in March, the young plants potted off when about an inch high and planted out in May. They begin to flower in June, and continue to bloom profusely till frost-time.

The annuals are collectively known, in distinction from the perennials, as *Calliopsis*. Among these the best known are *Coreopsis tinctoria*, *C. cardaminefolia*, *C. coronata* and *C. Drummondii*. The last two are low-growing species, bearing the flowers on long pedicels above the rather thick foliage. They do not make as good an effect in massing as some others.

Probably the most widely cultivated species is *Coreopsis tinctoria*. This is a pretty, slender-growing plant, much branched, and with very narrow linear leaves. The type has yellow rays with a purple-brown blotch at the base, but there are numerous variations, in some of which the entire flower is purple-brown. *Coreopsis* is better adapted for massing than for planting singly. *C. tinctoria* makes a good background for an herbaceous border. Some of the dwarf varieties, differing from the type, are erect and shapely and bear their flowers in a close mass. These make a pretty border for a bed. Variety may be added by proper selection of colors. *C. tinctoria*, cut with long stems, makes a pretty bouquet for a mantelpiece or large dining-table. I have seen a pleasing effect obtained by cutting the stems long and placing them in a loose bouquet in a large vase. They fall over the sides of the dish and readily suggest both the lack of compactness which characterizes the growing plant and its natural gracefulness and delicacy.

University of Vermont.

V. A. Clark.

Correspondence.

The Vitality of Seeds.

To the Editor of GARDEN AND FOREST:

Sir,—Referring to Mr. Hatfield's article on the vitality of seeds, I may add to the list the graceful and showy *Ipomœa coccinea*. Fully as interesting are the unfavorable conditions under which seedlings will thrive. A trellis around the stump of a tree was covered last year with this *Ipomœa*, which, as usual, self-sowed its seed. Some fell into a diminutive crack in the top of the stump, and this year two small plants about a foot or so high are flourishing without any soil to grow in. They did not even seem to feel the need of water before the last rains set in.

A neighbor of mine picked a seed-pod of *Cobæa scandens* late in the fall and allowed it to ripen in the house during the winter. On planting the seeds the following spring the plants came up with variegated foliage and retained the variegation throughout the season. The ripening of the seeds in the house rather than on the vine caused, perhaps, a certain diseased condition of both seed and plant.

Bergen Point, N. J.

L. C. L. Jordan.

Range of Pacific Coast Lilies.

To the Editor of GARDEN AND FOREST:

Sir,—Since writing the series of articles on Pacific coast Lilies, which have appeared in GARDEN AND FOREST, some interesting facts regarding their distribution have come to my notice. The range of *Lilium pardalinum* extends to Julian, in San Diego County, California, well toward the Lower California line. This gives this species a distribution from Lower California to British Columbia and to Lake Winnipeg, truly an immense range.

Hitherto I have only known *Lilium Washingtonianum* as existing in the Sierra Nevada and Cascade ranges. I now have definite knowledge that where the Rogue and Klamath rivers break through the Sierra chain, *L. Washingtonianum* follows them to the sea. They are common in the Siskiyou range. *L. Washingtonianum* follows the Trinity, the great

southern tributary of the Klamath, and I have at hand specimens of it collected only thirty miles from Eureka, in Humboldt County, California. At this point *L. Washingtonianum* makes a wonderful growth, being rarely less than seven feet high, and the flowers are pink. Some stalks were fourteen feet high.

Lilium rubescens, its near relative, is found at points not over fifteen miles south, and I think that I can safely say that I have determined the northernmost extension of the one and the farthest southerly extension in the Coast Range of the other.

Ukiah, Calif.

Carl Purdy.

The Sycamore Blight.

To the Editor of GARDEN AND FOREST:

Sir,—Observing Mr. Olmsted's request in GARDEN AND FOREST of July 21st concerning the blight of the Plane-tree, I report from this vicinity that the native *Platanus occidentalis* suffered badly. Many appeared in June quite dead, but some are now thrusting out new sprouts which may or may not mature. I know of but eight trees of *P. orientalis* about here. Four of them are vigorous trees. These four did not suffer at all. The other four are weak trees, and did suffer some in June, but less than the natives did, and have now substantially recovered.

When *Platanus orientalis* is to be planted I think a small vigorous tree should be selected, good ground chosen and kept heavily top-dressed for several years. Trees treated in this way flourish for a dozen years at least. What they do later is beyond my experience.

New Bedford, Mass.

Thomas M. Stetson.

The Elm-leaf Beetle.

To the Editor of GARDEN AND FOREST:

Sir,—I have occasionally read in your journal of machinery for spraying trees on a large scale as a remedy against insects and fungi. Would you advise a borough to purchase a machine or to employ some one to undertake the spraying of the trees by contract? If you advise the purchase of a machine, what particular pattern would you recommend, what is its probable cost, and where could it be obtained?

Morristown, N. J.

S.

[These questions cannot be answered categorically without some further knowledge as to what our correspondent proposes to accomplish. The best advice we can give him is to get the *Year Book of the Department of Agriculture* for 1896 and study the article by Dr. L. O. Howard on The Use of Steam Apparatus for Spraying. There is no doubt that a steam engine can be made useful for the protection of shade-trees, and that it is the most economical way to treat a large number of trees, and the letter which follows this reply gives an account of one fairly successful experiment in this direction. A very excellent apparatus is now used in the public parks of this city, which was constructed under the supervision of Mr. E. B. Southwick, the entomologist of the department. Some such apparatus ought to be at the command of every city and town which takes any interest in its shade-trees. Dr. Howard's article goes into the details of the subject, gives the history of many attempts which have already been made in this direction, with the reasons for their failure when they have failed, and it is full of suggestions which cannot but be useful to any one who takes any serious practical interest in the matter.—Ed.]

Our Street Trees and the Elm-leaf Beetle.

To the Editor of GARDEN AND FOREST:

Sir,—The question of preserving our street trees from insect devastation is becoming quite a serious one in some of our cities, especially where the Elm-leaf beetle is most active. Spraying the large trees is rather expensive, and more or less difficult, but can be readily done if steam power is employed, as has been demonstrated in several cities. Most city governments are poor, however, and many persons seem to believe that in some way or other the trees will take care of themselves, or that the beetles will be kept in check by means of natural enemies without man's assistance. It is only when trees actually die from the effects of attack by the beetles, and such object-lessons as may be found in Milford, Norwalk and

New Haven come to the notice of the people, that remedial action is taken.

During the spring of 1896 the city authorities of New Haven made an appropriation for spraying the Elm-trees. The work was placed in charge of Mr. T. B. Kelly, Superintendent of Parks, who prepared an outfit for the purpose and used a four-wheeled road-engine connected with hose to an ordinary street-sprinkler. The machine worked well, and many of the large and beautiful Elms of the city were sprayed, not only once, but two and three times. The work began early in May, and a great many cankerworms, which are so destructive here, were killed. The park and street trees in the central part of the city were first treated; then the trees along the streets extending radially from the centre, as much ground as possible being covered before a second application was necessary. The people residing in the sprayed district were generally willing and eager to coöperate, and did so by treating or having treated, at their expense, the trees on their own grounds, and often the street trees in front of their residences. The foliage of the Elms throughout the sprayed area was fairly well preserved for the season. There were, of course, a few exceptions—some of the trees being injured by cankerworms before the poison was applied—and here and there a tree was injured by the poison itself, either from being improperly prepared, or more probably from not being kept properly agitated in the tank during the process of spraying. Many trees in the outskirts of the city, and probably more than one-half the total number of trees within the city limits, received no treatment during 1896. It is needless to say that these trees were injured, but the injury was less than that received by the same trees this season. Both the cankerworm and Elm-leaf beetle have come and gone, and the trees in the central part of the city that received thorough treatment during 1896 have retained their green leaves and are comparatively free from all insects. This personal observation is corroborated by Mr. Kelly. Outside the district sprayed in 1896, the leaves of many magnificent Elms were riddled by cankerworms in May; some were stripped of every leaf. Later, the Elm-leaf beetle attacked the remaining portion of the partially consumed leaves, soon turning the trees from green to brown. It will be interesting to note the appearance of the trees next season, to see if those sprayed in 1896 are as badly affected as the others; or, in other words, how long it will take for the region again to become badly infested where the work was done thoroughly.

It occurs to me that treating half the trees in a season, and the remainder the following year, may possibly be an effective and economical way to preserve the foliage of our street trees. I am not aware that this method has been thoroughly tested. I speak of it only because observations here during two seasons point in that direction. Of course, the spraying must be well done each year, and a little overlapping each time would help make it a more complete success. Trees along the boundary between the sprayed and unsprayed districts might need spraying every season. Even then it would be much less expensive than treating all the trees, if that were possible, and doubtless would kill the insects in far greater numbers and keep the trees in a better average condition than spraying the same trees every year, where a portion only can receive treatment. Both the cankerworm and the Elm-leaf beetle would be killed if the spraying was begun early in the season.

I would like the opinions of entomologists, through your columns, regarding the practicability of preserving the foliage of our street trees by the method of treatment which I have suggested.

Agr. Exp. Station, New Haven, Conn.

W. E. Britton.

Recent Publications.

A Few Familiar Flowers: How to Love Them at Home or in School. By Margaret Warner Morley. Boston: Ginn & Co.

In spite of its rather sentimental subtitle, this is a book of practical value in the suggestions it makes for the proper methods of what it has become the fashion to call "nature study." It is not a book for students, but for teachers, and, we may add, for young teachers, giving them hints to make them skillful in helping children to look for themselves and think for themselves. Only five plants are spoken of—the Morning Glory or Bindweed, the Jewelweed, the Nasturtium, the Geranium and the Hyacinth—and the object is not primarily to teach children how to add some meaningless names to the different parts of a flower, but to help them discover and understand the func-

tions and uses of the various parts of the flower and the relation of its structure to its uses. The primary purpose is "to enable the child to feel that the flower is alive, that it does things, and is an individual like the rest of us." To this end no attempt is made to accumulate a great mass of facts, but to hold the interest and stimulate the curiosity of the pupil to investigate the life-story of a plant for himself and become thoroughly acquainted with it. The adaptation of the Bindweed-flower to cross-fertilization by bees is set forth at the very outset. It is shown how the color, form and position of the flower helps the bee in its search for nectar, and how the bee helps the plant in placing the pollen where it needs to go in order to form seed.

No one can read the book without being convinced that by a study of these few plants, under the guidance of a wise instructor, a child can learn more about the essentials of plant-life than he can by pulling it to pieces and labeling its different organs. Even a young child can appreciate the vital facts in the biology of a plant, and if his investigations are properly directed he will find that in every organ and in the position and attitude of every part of the plant there is order, and that each organ has a distinct duty which it conscientiously performs in the interest of the whole organism. The study commences with the flower, but the other portions of the plant are taken up in turn, and it is shown how the root and fruit can be made quite as interesting as the flowers. The book contains a little cheap moralizing here and there which could as well be omitted, but upon the whole it is a performance of genuine merit, and we could wish that every young teacher who thinks that she (for the feminine pronoun is invariably used in this work when the teacher is alluded to) has an adequate knowledge of botany because she can give the Latin names to all the common plants which come in her way, would carefully read these simple lessons, or rather would take these five plants and study them in connection with the text of this little volume.

Notes.

The Sweet Pea, Queen Victoria, was the most admired flower on exhibition at the Springfield show. It was seen at its best in the collection of Mr. Hartzell, who exhibited the Eckford set of 1896.

Professor H. V. Wilson says that no visitor to Wilmington, North Carolina, can fail to notice what an admirable street-tree the Laurel Oak makes. Its straight trunk, symmetrical top and moderate size give it an elegance of shape well suited to city streets, and the impression of finish is heightened by the glossy aspect of the foliage.

Dr. Lintner, State Entomologist of New York, has prevailed upon the Common Council of Albany to purchase a steam sprayer for use against the Elm-tree beetle in that city. The pest has almost destroyed many beautiful trees in the parks and residential streets, so that they are naked as they are in winter. It is to be hoped that this prompt action will save many of the trees.

The Russian Apricot, Early Montgamet, is being planted to a considerable extent in central New York, where it is considered not only superior to all the Russian Apricots, but to every other variety of that fruit for planting in northern orchards, when its hardiness, productiveness and general quality are considered. Mr. S. D. Willard, of Geneva, an admirable authority, thinks that it can be grown with success wherever the Peach will thrive.

Our native Prairie Rose, which is figured on another page of this issue, and which has only recently found its way in any considerable numbers into American gardens, is beginning also in Europe to find the appreciation which its merits deserve. In the current number of *The Garden* it is stated that a large mass of this Rose in Kew was making a most effective display in the last week in July, and that, in spite of the fact that it lacks fragrance, it was there considered one of the most attractive of the hardy shrubs which flower at that season.

The autumn meeting of the American Forestry Association will be held at Nashville, Tennessee, on the 22d of September, with papers by George B. Sudworth, Colonel J. B. Killebrew, J. A. Holmes, H. A. Hazen, D. W. Baird and F. H. Newell. It

has been arranged that an excursion, including the members and their friends, shall leave Washington on Thursday, September 16th, for Asheville, North Carolina, and a visit to the forests of Mr. George W. Vanderbilt, under the direction of Dr. Schenck. The party will reach Lookout Mountain on Saturday evening and Nashville on Monday morning, September 20th.

A late number of *The Garden* contains a beautiful colored illustration of the Bicolor Daffodil, Ellen Willmott. This is one of Mr. Engleheart's creations, and it is a seedling from John Horsfield fertilized with the pollen of a selected form of *Narcissus variiformis*. The plant is rather dwarf, but it throws up a tall stout stem which carries a flower of remarkable substance, symmetry and color. The white lobes of the perianth slightly overlap each other and they bend forward slightly at the tips. The trumpet is of a clear yellow and of just the proper size to suit the cup. It flowers early, a little in advance of its seed parent, whose robust constitution it seems to have inherited.

The American Florist last week reproduced the photograph of a hedge of the Crimson Rambler Rose, which shows that the vigor and hardness of this plant, together with the abundant way in which it produces its brilliant flowers, adapt it in a remarkable way to such a use. The hedge pictured is 135 feet in length and it is on the estate of D. Willis James, Esq., Madison, New Jersey. Mr. William Duckham, the gardener, set out the plants from pots where they had been grown on their own roots in May, 1896, and in June of this year, when the photograph was taken they were making a magnificent display. Shoots were tied to a wire support stretched between iron posts, and there were some fifty clusters of bloom to every linear foot.

At the annual meeting of the Vermont State Horticultural Society, Professor W. M. Munson called attention to the fact that although individuality is as strongly marked among trees of the same variety as it is among animals of the same breed, yet not one nurseryman in a hundred gives any heed to this fact when he begins to propagate. Scions are taken from the most available source, which may be a nursery row or a convenient tree of the variety needed, and with no reference to individual characteristics. Professor Munson has no doubt that this neglect in the matter of selection has more to do with the failure of orchards than any other one condition. It is one potent cause of the so-called "running out" of varieties. Breeds of horses, cattle or swine treated in a similar way would also run out very soon.

At a recent exhibition of the Royal Horticultural Society much interest was excited by a new hybrid Orchid raised by Messrs. Veitch & Sons, and called *Epilælia* × *Radico-purpurata*. As its name indicates, it is the result of crossing *Epidendrum radicans* upon *Lælia purpurata*, and although it is not the first time that such dissimilar genera have been united, it shows the striking possibilities in the way of new groups in this remarkable family. The seed of the *Lælia* fertilized by the *Epidendrum* was sown in September, 1892, and the seedling flowered in July of the present year, and the flower again, as well as the plant, shows the strong individuality of the pollen parent, as it did in the case of the hybrid between *Epidendrum* and *Cattleya*. The plant has a slender reed-like, root-bearing stem, and the flowers are borne on a slender peduncle fourteen inches long. The color is rich orange-scarlet, base and centre of the lip lemon-yellow, margined with light reddish purple. It is two inches across, with lanceolate sepals, ovate petals, broadly ovate lip and a crest with three yellow keels.

Professor M. V. Slingerland writes to *The Rural New-Yorker* that the San José scale was discovered at Cornell University last April on some of the ornamental trees and shrubs, and in May before the hibernating scales began their spring growth the bark of the trunks and larger branches were thoroughly washed with whale-oil soap, dissolved at the rate of two pounds to a gallon of water. On the 25th of June, when the scales which had wintered over had made considerable growth, every infested plant was thoroughly drenched with spray containing one part of kerosene to five parts of water. Very few of the leaves on the Dogwoods or other shrubs were injured, and a second application of the same spray was made on July 2d. The result is, the scales have been practically exterminated by three applications, but it must be understood that the spraying and washing was not done in a half-hearted way, but by a man who understands the business. This seems to indicate that the pest can be controlled by vigorous and thorough work.

Last week marked the heaviest shipments of California fruits ever sent to this city, and 105 carloads were sold. The

plums now seen in great variety are of the richest colors and largest size and maintain fair prices, but California peaches, which come at this time into direct competition with the eastern product, sell at prices so low as to allow small profits, if, indeed, any to the western grower. Choice Barlett pears are still seen, and Flame Tokay and other grapes are improving in color and flavor as the season advances. Several well-known varieties of nectarines are included among these western fruits, but in the partially ripened condition in which they arrive these do not seem to appeal strongly to popular favor among more luscious and juicy fruits.

Mr. Joseph Meehan writes us that the so-called blue varieties of *Picea pungens* are unusually beautiful this year in Germantown. These trees vary much in color, and in a collection of seedlings many individuals will be as green as the Norway Spruce, but the silvery blue of the new growth of other individuals makes them more striking at this season than almost any conifer. Both *Cedrus Deodora* and *C. Atlantica glauca* are now covered with the silvery foliage, the *Deodora* Cedar seeming to make the best display, not because the foliage is of a lighter color, but because it is more abundant. The Atlantic Cedar seems to be the hardier of the two, although both succeed perfectly well in Germantown. *Cephalotaxus Fortuni* comes through the winter in Philadelphia as well as the Yews do, rarely suffering more than a slight browning of the foliage. *C. Fortuni* forms a spreading bush with foliage of the very darkest green.

According to *The Gardeners' Chronicle*, which has been making a careful summary of the prospects of the fruit crop in the British Islands, there will be a marked deficiency in the apple crop all over the kingdom. Out of 314 reports only ten are marked as over the average, while 230 are recorded as below it. Plums, the next most important crop commercially, show even a greater deficiency, from which it is clear that for both these fruits Great Britain must rely upon foreign sources of supply for the year. In regard to small fruits the case is different, and it is worth noting here that at a recent London exhibition, one firm, Messrs. James Veitch & Sons, sent a collection of one hundred varieties of gooseberries. Of course, we can grow good gooseberries and grow them well in America, but when we read of a dozen first-class varieties of red gooseberries, as many more of green berries, not to speak of yellow berries and white ones, and of a smaller class of highly flavored berries, red, yellow and green, each containing half a dozen varieties of the first merit, we understand that in the cultivation of gooseberries this country is far behind England.

The third annual meeting of the National Apple Shippers' Association was held in Buffalo, New York, on the 5th, 6th and 7th of this month, the object being to obtain accurate reports of the condition of the apple crop in various sections of the country and to regulate the system of grading and fix standards which can be definitely relied upon by dealers. In his opening address the President, E. P. Loomis, of this city, showed the growth of the apple trade, and stated that whereas in 1889 there were produced 57,242,000 barrels of apples in the United States, in 1896 the yield amounted to 75,000,000 barrels. Of 2,558,370 barrels of this fruit exported from the port of New York last year, almost all came from New York, Pennsylvania, Ohio, Michigan, Indiana, Illinois and Missouri. The exports from Virginia are usually important, being mainly of choice Albemarle or Newtown Pippins, but last season's crop was a very light one. Mr. Loomis said that the exports of fruit, mainly apples, had grown from \$24,974 in 1850 to \$542,502 in 1870, and increased rapidly thereafter, until in 1894 \$2,299,006 represented the value of these shipments from this city alone. The apple crop for 1897, estimated from reports of the statistician and of members of the association and from other reliable sources, is said to be considerably smaller than the immense crop of last year, but equal to the average, and the largest crops this year, as would be expected, are promised in sections which produced small crops in 1896. Colorado, California and Oregon are rated at 100 per cent. for this year, or as yielding a full crop, and some of the middle western states are rated at seventy to ninety per cent. From New York state but one-quarter of a full crop is expected, and other eastern states promise from half to two-thirds of a full yield, Virginia being counted at seventy per cent. Canada is rated at forty per cent. The grading of apples, transportation and a uniform bulge for the sides of barrels were among the subjects discussed, and with the length of staves, number of hoops and size of heads already fixed for the standard barrel, not less than sixty-four and a half inches was decided upon as the bulge.

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The Planting of Private Grounds.

THIS is a season when little actual work needs to be done in gardens and pleasure-grounds. Therefore it is a good time for contemplation—for self-instruction. It is the time to judge the results of past work—to decide whether what has been achieved is good or is bad, and to examine why it is so. And it is the time to plan for the future—to decide what more shall be done, what shall be undone, and from what the enterprising hand shall be altogether withheld. Plans should be made to correct past sins of commission, to repair past sins of omission, and to guard against both for the days to come.

The great sin of commission which a study of ornamental private grounds in all parts of our country reveals, is the failure to cut out trees and shrubs which were always ill-placed or which have been rendered detrimental or superfluous by years of growth and development. Everywhere we see country places, small ones especially, which, whether viewed from the inside or the outside, are less beautiful than they might be because their plantations are too crowded. A house may well be draped and shaded, but it should not be concealed or smothered by foliage. Charming outlooks ought not to be shut off. A fine tree ought not to be hampered in its development by others less attractive. Two or three trees of equal excellence ought not to be allowed to survive so long together that the beauty of all will be ruined. A shrubbery ought not to look like a rough thicket, nor should a place be so crowded with shrubberies as to look like a wilderness. Health as well as beauty demands that foliage should not be too dense in the neighborhood of a dwelling-house, for human beings, no less than plants, need the free ministration of the winds and the sunshine of heaven. Therefore, at this season of the year, every owner of a country place, large or small, should look carefully at his trees and shrubs, and should decide whether it may not be for the greatest good of the greatest number (himself and his family included) that some of them shall be cut out.

Corresponding to this sin of omitting to use the axe when its use is required, is the sin of commission involved in planting excessive numbers of trees and shrubs. Even

when allowance is made for the need of young trees to be protected, and for the need of the planter to guard against the possible failure of some, too many are usually set out on a new place where Nature has not already supplied a superabundance. The beauty of placid open spaces of grass, the charm of far-away vistas and the dignity of simplicity in the general effect of a place are forgotten. Even when large lawns are reserved, they are generally sprinkled over with isolated plants to such a degree that their true beauty is fatally impaired. Therefore the owner of a place where planting is needed should carefully consider, before the season to attempt it begins, just where he had best put his thick plantations, and just how many—or, rather, how few—trees and groups of shrubs need to be set near his house and upon his lawn. He should have a definite scheme in mind before any work is started, and, in spite of the profuse temptations of nursery and garden catalogues, he should strictly adhere to this scheme unless definite good reasons for its alteration present themselves.

Of course, it is impossible to lay down any general rules with regard to the desirable amount or to the desirable distribution of foliage in a small country place; for each place differs from all others in the conformation of its ground, the character of its native vegetation, the attractions of its outlooks, and the tastes of its owners. For example, there are seaside situations where Nature has done scarcely any planting, and where no more is required by a sensitive eye unless, perhaps, in the way of a few hardy shrubs and vines set about the foundations of the house to make it look as though it belonged to the ground upon which it stands. On the other hand, in inland regions there are places where thick, shadowy groves of Nature's planting need only to be thinned sufficiently for the due admission of air and light and the opening of vistas. Between these two extremes lie many intermediate possibilities of beauty.

One general precept can, however, be laid down: Respect should be paid to the essential character of the country-side at large. If it is covered by trees of great size and beauty, your place will not look well if it seems to be a barren exception to the local rule of luxuriant growth. And, if it is a barren stretch of seashore, your place will not look well if you spend thousands of dollars in setting out thick groves of trees, and try to cultivate plants of luxuriant aspect better suited to the fertile soil and surroundings of some interior valley region. But even this great general rule of appropriateness to broad local conditions should not be pushed too far. Respect must be paid to the charms of variety as well as to those of harmony. In a thickly forested district, for example, fine trees should be secured; yet broad open lawns will be peculiarly attractive as a relief to the eye satiated with dense woodland effects. And, correspondingly, while many a seashore place demands no planting at all, yet if one or two good trees can be induced to grow near the house they may delight the eye much more than if they had been met with in regions where similar ones abound.

However, most people need to be more carefully warned against planting too much than against planting too little. It is extraordinary to see the energy often bestowed upon the creation of a wide lawn, and then the equal energy displayed in ruining it with a cluttered assemblage of freshly introduced plants. Everything which the spot naturally bore is cut down and grubbed up. Often even picturesque rocks, or wide low stones, invaluable as giving dignity and individuality to the place, are removed at great expense. And when at last the wide sheet of green is secured, forthwith it is broken up and frittered away by being dotted over with a hundred garden trees or shrubs.

The mention of rocks suggests another rule which may, in a general manner, be prescribed. If one or more stones, large or small, break the uniformity of a lawn, the places for possible planting are thus naturally indicated. Of course, even here planting is not always required, and it may even be injurious if a fine view is thereby spoiled, or if the har-

monious lines of other plantations are interfered with. But if the lawn is so large that a few trees or bits of lower foliage will not spoil it, and if no special reasons prevent, then the best places for them will be in association with any rocks or stones that may exist. The existence of these as alien objects in the spread of turf gives a logical reason for the presence of others. And the effect of both stone and tree will be enhanced by the association of the two. The Japanese understand this truth very clearly. There is nothing to which they give closer attention than to the grouping of trees and stones. Often, indeed, the rock or stone itself is introduced to complete an effect which seemed incomplete without it; and sometimes the desire for a stone appropriate for association with a given tree leads to its importation from some distant part of the empire. To such subtleties of artistic endeavor we have not yet attained. But two at least of our American landscape-gardeners—Mr. Olmsted and Mr. Vaux—have thoroughly understood how much beauty may be gained by the proper combination of vegetable and lithic forms. The result of their combined work may be studied in the Central Park. No features of this beautiful and individual pleasure-ground are more beautiful or more individual than its groupings of stones and foliage. And although some of its most admirable results in this direction were obtained by clothing existing rocks with foliage, in other cases the stones as well as the plants were deliberately selected and placed. The more "natural" their effect the less sure can the observer be that there is anything really natural about them, for he instinctively applies the word to those things in Central Park which are to-day most beautiful, while only the student who has inquired into its genesis can guess how often these very things are altogether the products of art.

If, therefore, a rock or stone breaks the uniformity of a lawn, the advisability of planting something in connection with it may well be considered. Of course, its size and shape and situation must determine how many plants should be set beside it, and of what sort and size they should be. If it is itself of large size, a goodly tree may overshadow it. A smaller stone will demand a smaller tree, or one or two graceful shrubs. And a ledge which spreads near the surface of the ground may demand only a prostrate shrub or some creeping plant. Vines may always be introduced, in moderation; but whether with vines or with larger plants, moderation must always be practised. The last thing that should be done with a picturesque stone is to cover it up. Its character should be enhanced and completed, not overshadowed or concealed. It should not be "planted out" by thick tall masses of foliage, nor allowed to disappear beneath heavy wreaths of trailing or creeping things. An harmonious group should be formed in which, as a rule, the stone itself should be the most conspicuous feature, or at least, speaking artistically, the central feature. How this should be done Nature will teach, if her own works are lovingly studied. The planter who has tasks of this kind before him cannot do better at this season than drive along the country roads, or wander through old meadows and open woodlands, and see with what combinations of foliage Nature adorns her huge rocks, her smaller boulders, and her low out-cropping ledges of stone.

The Dalles of the St. Croix, Wisconsin and Minnesota.

FOR some years a movement has been on foot to secure a reservation of about 1,550 acres on the picturesque banks of the St. Croix River for an interstate park. The nucleus of this park is a tract of one hundred and fifty acres already acquired, including some of the most picturesque scenery of that wild region which received its name from the early French voyageurs. The French word *Dalles* signifies flagstones, and the term was here applied on account of the peculiar stratification of the rocks of this

part of the St. Croix River, which, owing to their post-glacial undermining by the water and the action of frost, have fallen down in great blocks and slabs, separated along their natural, almost upright planes from the rock walls which border the stream.

A gloomy grandeur characterizes this part of the river, which contrasts delightfully with the cheerful sparkle of the upper rapids, the quiet beauty of Thaxter's Lake and the sunny intervalle with its scattered shade-trees, which are also features of the scene. The hills on the Wisconsin side are lofty, and the Minnesota gorges precipitous, and a fine old forest forms a boundary between the stern scenery of the embattled rocks and the quiet farm lands toward the west. Should the whole tract desired by the park commissioners be set apart by the legislatures of the two states it will include a most interesting variety of landscape, ranging from the broad lawn-like expanse of the intervalle to the savage features of the shadowy gorges through which the whirling stream tumbles and foams. The hope is to maintain the wild, natural features of this scene, and to preserve and enhance its native distinction by protecting it from the devastating hand of the settler, the woodcutter and the manufacturer.

Some account of the strange formations which characterize this region may prove interesting. An admirable report, published recently, contains papers by scientific men and the landscape-gardener of the park, Mr. F. H. Nutter, and furnishes numerous valuable details concerning the reservation. From this report we learn that the Dalles of the St. Croix River, situated in Chisago County, Minnesota, at the head of navigation, with certain adjacent lands, were acquired by the appropriation of \$6,000 by the Minnesota legislature in April, 1895, and ten days previously the Governor of Wisconsin approved a bill to obtain lands in Polk County of that state, along the east bank of the St. Croix, and commissioners were appointed to examine the lands and report concerning them. Since the purchase of the first 150 acres, bills have been pending before the legislatures of the two states to secure about 300 acres additional in Minnesota and 1,100 in Wisconsin, and it is to be hoped that political influence will not prevent the carrying out of a scheme so important to the welfare and enjoyment of future generations. Active-minded citizens have been working hard for this desired consummation, and great interest has been shown by the local press. A series of lectures at Taylor's Falls, Minnesota, was arranged for, to which eminent speakers gave their services, and the adjacent railways aided also. The commissioners worked with zeal, the ladies of the Twin Falls coöperated with the aldermen to help them, and the work was pushed along and public interest aroused so that it is to be hoped the future of the Interstate Park is practically assured.

The peculiar and unique character of the Dalles entitles them to be preserved from spoliation forever. The rocks which compose them are the trap or basalt which, when upheaved in vast masses and left to cool slowly under pressure, forms regular columns like those of Fingal's Cave or the Palisades of the Hudson. Here, however, where they were thrown up in lighter masses and cooled without great pressure, they form irregular angular heaps with smooth, almost unbroken cleavage. Their color is beautiful and varied, owing not alone to their mineral composition, but to the growth of minute lichens upon their surfaces, which vary in color with the dryness or moisture of the atmosphere. Sometimes they are sombre gray, and again iridescent with opaline tints. The rock angles are sharp, their faces as unworn as if they had not weathered thousands of years of storms, and they are especially remarkable for the freakish forms in which they rise into columns or monumental piles, and for the strange outlines of human faces which one detects in their irregular shapes. Holes, called wells, some of which are thirty feet in diameter, and others only a few inches wide, are found here, formed by the churning of boulders during the cascade period through which the

region passed in prehistoric days. In some of the wells the drilling rock is still found; in others it has entirely disappeared. Into one of these wells, eight feet in diameter, a pole has been thrust down thirty feet; others are choked with debris and cannot be fathomed. Of the columnar formations the Devil's Chair is the best known. This towers about eighty feet above the level of the river, in the form of a huge chair, apparently built by some giant, of roughly hewn masses of rock. Vegetation clusters about its base, and tall Pines spring from the cliffs behind it, but its smooth top is bare, like some strange vestige of the furniture of an age of Titans. The Hammer Head is a column with two grotesque faces looking in opposite directions, like a statue of Janus, and the Sentinel, or Warden, on a ledge overlooking the Narrows just below the bridge, is strangely real, lifting a stern granite profile against the sky. Other faces, in which one detects fancied resemblances to Washington or Napoleon, are found all through the region, and one, Professor Edwards tells us, is a gigantic likeness of a Ute Indian, with Pine-trees for feathers, and trailing vines for scalp-lock, while a leafless Pine branch does duty for a pipe in his mouth. On the Minnesota side of the river there are all sorts of queer rock formations, of such supernatural size and shape that they are called Devil's Bake Oven, Devil's Pulpit, Devil's Parlor, etc., but on the Wisconsin side holier emblems appear, and one of its most striking features is the uplifted image of a great stone cross, which, particularly when touched by the rays of the sunset, is a noble and impressive monument. On this bank also is found a lovely lake, a beautiful resort for canoeists.

The Indian name of the most beautiful lake of the region, Kichisago Sagi-a-gan, meaning large and lovely lake, still lingers in the name of Chisago County. Traces of early French occupation are found dating to about 1700, when the long-vanished fort St. Croix was established on a plateau below the Dalles. Near Taylor's Falls were still to be seen in 1851 the stone foundations of at least nine houses, over some of which were growing trees two feet in diameter, with hearthstones worn smooth by use, apparently a century old. This early civilization had been long extinct, however, when the pioneer of the present settlement put in claims to the Dalles in 1837. The village of St. Croix was first known by the Indian name of Caw-caw-baw-kong, which might seem to have been suggested by the warning notes of crows, but means simply the waterfall. This name is still preserved in a neighboring cemetery.

The flora of the Dalles is rich in vines and flowers that love a northern climate, and its silva consists of Pines, Firs, Cedars, Birches, Willows, Poplars, Maples, Walnuts, Elms, Ashes and Oaks. The rocks are hung with Ferns and Harebells, and all sorts of sweet wood blossoms are found in their season nestling in the shade. The Walking Fern lingers in the little marshes at the base of the trap-rocks, and Arrow-heads abound. Here, too, flourishes the Cranberry, trailing its delicate vines over barren surfaces, and Grasses and wild plants clamber over the hills in profusion. A report by Mr. Conway Macmillan, State Botanist of Minnesota, states that if it had been the idea of the legislatures of the adjacent states to preserve a typical group of northern plants as a kind of natural botanic garden, they could scarcely have selected a more favorable locality than the region about the Dalles. Few southern varieties of trees have strayed into this region, but the Juniper, the Larch, the Spruce and the Canadian Yew abound, while some noble specimens of the White Pine survive the wholesale devastation by the lumbermen. A variety of the Club Moss is characteristic of the bare hills near Taylor's Falls, and Ferns flourish freely, among them the little Woodsia, the Rock Brake and the Bulb-bearing Fern, which tapestries the cool ravines with its feathery fronds. The wonderful Mosses and Lichens which play so important a part in the color-scheme of the Dalles have already been referred to, and among the former are seen the famous Reindeer Moss, more properly a

Lichen, and the Fountain Moss, found only in water, grows here to sometimes a foot in length. Liverworts, kindred to the Mosses, are also in profusion, and great carpets of them may be found on damp cliffs near the springs. About a thousand species of the higher groups of plants are established about the Dalles. Rock Cresses and the Jewel-weed are everywhere. The Ram's-head, Lady's-slipper and the tiny Hydrocotyle now and then appear. Anemones, Violets, Jack-in-the-pulpit and other northern flowers in spring, and Golden-rod and Asters in autumn make the woods and fields gay with blossom. Heaths, dwarf Cornels, Indian Pipes, the southern Pulses and Spurges also abound, and one interesting plant, the Prickly-pear Cactus, has strayed hither from the desert. In short, the Dalles are a natural wild garden full of interest.

The landscape beauty of this reservation is inexhaustible. From one high point on the Wisconsin side below the elbow in the Dalles is seen the little town of Taylor's Falls nestling by the river, and another distant town on the Minnesota side gleams white against the background of hills dark with evergreens. A slender steel bridge spans the winding river, and under it the water foams and swirls between the rocky banks crowned with Spruces and Firs. Other stretches of the stream are as still as a lake in whose quiet bosom the shores are reflected, and a floating canoe scarce leaves a ripple behind. In the rapids all is commotion. The drifting logs struggle in heaps; the vexed stream roars and leaps, white with foam, down the incline. Again you paddle through a narrow gorge, where strange forms rise like monuments before the wondering gaze. Marvels of color delight one. Nature has clothed the rocks with red and purple and green, festooned them with vines and starred them with tender flowers. On all this beauty stern rock faces look down like petrified Jötuns mourning over the destruction of their forest home. There is a mysterious and terrible attraction about the fathomless wells dug by the slow grinding of the glacier. The geological formation tells a tale of prehistoric convulsions, of strange upheavals, of a boiling caldron wherein boulders and pebbles whirled about, and are now found imbedded in the trap-rock like plums in a monster pudding, afar from the present bed of the stream.

Merely as an object-lesson of botanic and general scientific value the Dalles are well worth preserving, and their exquisite wild beauty will be more and more cherished as the region about becomes more settled. It is a source of gratification to all lovers of nature that public-spirited citizens enough were found in the two states to preserve this gem of natural scenery from destruction as an Interstate Park before the hand of the spoiler, with pick and axe, had converted its rare features into utilitarian dust and ashes.

Hingham, Mass.

Mary C. Robbins.

Ecological Notes upon the White Pine.

THE œcology of the Pines, especially of the White Pine, *Pinus strobus*, has interested me for many years. I have seen the White Pine in about all the conditions to which it is subject in the region of the Great Lakes, the Saint Lawrence, the upper Mississippi and the northern reaches of the Alleghanies, which constitute its principal geographical range, and no tree growing within this climatic area adapts itself to a greater variety of soil conditions. The American Aspen, the White Elm, the Red Maple and the Red Cedar compare most favorably with it in this regard. Its most congenial soil is one containing a fair supply of sand and gravel or light loam, where it usually attains the largest size. It does not generally occupy the ground so exclusively as the Gray Pine, *P. Banksiana*, or the Red Pine, *P. resinosa*, or several of the southern Pines. The finest examples are isolated or in companies of a few in forests of deciduous trees. Here it becomes their competitor, and from its range and ability to hold its own, except against fire and the axe, I should

never suspect any lack of virility, as has sometimes been charged to it.

The extreme conditions of soil and moisture for the White Pine are reached in the sand dunes and the rocky ledge and the peaty swamp. In dune regions its chief hardwood competitors are Oaks, mostly the Black, Scarlet, White and Bur Oak. In damper areas among the dunes, where the mineral constituent of the soil is chiefly sand, but mixed with more organic matter than on the hills, its principal competitors are species of Poplar and Birch. The dunes by the Great Lakes are as typical as any. Those at the south end of Lake Michigan, with their network of railroads, afford as adverse conditions as can well be found. Scarcely a year passes during which some of the ground is not burned over, and the ranging of cattle increases these unfavorable conditions. But in many spots on the sand hills, especially on their slopes, the White Pine if removed springs up again, and groves are formed in which trees from one to three or four inches in diameter closely crowd each other. If these chance to be protected for a sufficient time they make a respectable growth of timber, the smaller and weaker trees dying out by natural process of thinning. There are also spots where the Pines, both the White and the Gray, have an advantage over the Oaks. They are too damp or wet for any but the White Oaks. They are in hollows among the sand hills or flatter reaches of ground which have been raised above the swampy level by the gradual accumulation of sand brought in by winds and rains and by the deposits of vegetable matter, and thus have assumed drier conditions. Here the main competitors are the American Aspen and the Paper Birch, or, perhaps, the White Cedar. Thickets of Pine spring up in such places from seedlings to trees from ten to twenty feet in height. The soil is peaty, or has too great a supply of organic matter to suit the Oaks. Even the Tamarack may accompany the Pines, and the prevailing undergrowth shows plants adapted to peaty formations. Beyond the dune region in the bordering drift-covered land small areas are found among the hardwoods, where the Beech and the Sugar Maple predominate, in which the White Pine occurs. They are hollows, where sphagnum Mosses, *Vaccinium* and Gold-thread reveal a peaty soil. The bottoms, once covered with water, have been partially filled by soil washed down from neighboring hills and by the decay of organic matter, but are still wet ground.

Two or three more stations may be specified which show the persistence of the White Pine under different conditions of soil and moisture, as in western New York, where land was taken up and settlements began about a century ago. A farm in this portion of the state, in the western part of what is known as the "Finger-lake" region, came into my possession a few years ago. I examined with interest the remnants of its forest-covering and that on adjoining farms. The soil conditions differ widely from any already described. Its prevailing character is argillaceous. Though the underlying rocks of slate are heavily covered with drift, they are cut into and exposed by streams which rush down the steep hillsides. The principal forest-trees of the uplands are the Chestnut, Sugar Maple, Shag-bark and Bitter-nut Hickories, and two or three kinds of Oaks. The trees were comparatively young, for nearly all the larger ones had been cut down and removed. One of the pieces of woodland on the farm was well stocked with White Pine. It was on the top of a ridge where some gravel or sand was mixed with the clay, but the soil was essentially argillaceous. This wood was a mixed growth of Pine, Chestnut, Hickory and Oak. Scarcely a Pine exceeded a foot in diameter, showing that it was of recent growth. In ravines upon the hill-slope, difficult of access, were older trees, two or three feet in diameter. These were growing in a soil almost purely clay from the decomposed underlying slates, whose harder parts, where exposed, showed that they were slightly arenaceous. But they formed a soil very slippery and unctious to the touch when wet.

West of the Genesee River, and not many miles from this farm, other conditions of growth are found. Some are areas of limestone, with a thin covering of soil whose mineral ingredients are almost entirely derived from the underlying rocks. Silix is plentiful in the form of nodules of flint, the rock being the corniferous limestone of the New York system of geology. As the rocks decompose the nodules break up into flakes, and the soil is often so full of chert and bits of limestone as to resemble beds of crushed stone. Wheat and Red Clover have been the main crops where the more favorable portions of the land have been tilled. The trees are chiefly Oaks and Hickories interspersed with occasional clumps or trees of White Pine. Here the White Pine grows in a calcareous soil, siliceous matter being present from the decaying flint.

Close at hand is still another condition of growth. The streams which drain the slope of country to the south of this outcrop of limestone come down upon it. But it is so fissured or porous along certain lines of underlying gypsum that the smaller streams sink into the earth before reaching the farther edge of an escarpment, and the larger ones lose much of their volume or wholly disappear in the dry season. The water thus lost for a time bursts out again at the base of the escarpment in clear, cold springs. The streams they produce with the contiguous swampy land give rise to Cedar and Tamarack swamps; with the White Cedar and the Tamarack the White Pine is intermixed. The roots of trees in such situations are in contact with a soil more or less pervaded or even saturated with water, though the Pine in most cases affects the drier positions. The water, well charged with mineral matter, is also a cause of the production of drier conditions, for its lime carbonate is deposited in the swamps and marshes, where it is forming extensive beds of travertine which are gradually filling them up. The Pines in places may be seen growing on these beds of travertine, where they appear near the surface. Leaves of trees and of shrubs, aquatic plants and other organisms are imbedded and fossilized in it. They all help to form hummocks of limestone and produce more favorable states for the growth of certain kinds of vegetation, among which the White Pine has taken a place. But the soil is still very wet and prevailingly peaty.

These specific illustrations of conditions under which the White Pine grows could be repeated and extended in all essential particulars by cases taken throughout its range. Extreme cases, or those apparently the most unfavorable, have been chosen in order to show its power of adaptation. Its growth in rocky regions, either of sandstone or the crystalline rocks, as well as in sandy or gravelly areas, is most familiar; that upon the clay hills bordering the outlet of Canadage Lake is the most exceptional in my experience.

Chicago, Ill.

E. J. Hill.

Plant Notes.

Viburnum dentatum.

"It is wonderful to see the fertility of your country in *Viburnums*."
—Collinson and Bartram letters, 1765.

THE Arrow-wood, *Viburnum dentatum*, is the most conspicuous small-flowered member of its family, for, unlike the others of this group, it is not restricted to damp ground and shaded woodland belts, but grows equally well on dry banks and in open fields. The foliage is so clean and healthy-looking all summer long, with a striking red marginal coloration in autumn; the white cymes of blossoms are so showy, succeeded by almost equally showy blue berries, that one might reasonably suppose it a plant worthy of attention, but in central Pennsylvania all the specimens that have ever come under my observation have been in a wild-state. Of course, this *Viburnum*, like our other native species, is beautiful anywhere, for, taken as a class, there are no handsomer shrubs in our forest glades. But it does seem almost unaccountable that shrubs adapted to every use and situa-



Fig. 43.—Sprays of *Viburnum dentatum*.—See page 332.

tion should have been so universally neglected by American planters.

There is some bond between the Arrow-wood and Kinnikinnik, *Cornus sericea*, which it might be well to remember in planting, for they seem to thrive together when at home, and I have never found the latter in dry ground, except in company with the Arrow-wood. Unlike the Kinnikinnik, also the other blue-berried *Viburnums*, the fruit of the Arrow-wood is not very attractive to birds. Old mountaineers have told me that the berries were never eaten, but there is every reason to think they are mistaken.

The specimen from which the illustration on page 333 was taken is not very large, being about seven feet high, but it grows in a swampy meadow remarkable for fine *Viburnums*, and especially for beautiful Black Haw-trees; but the whole place is doomed, as the lower end is already the dumping-ground of a rapidly growing city. It would be interesting to know in round numbers how many, or rather how few, persons know our native *Viburnums*. The interest in naturalizing native plants is not yet widespread, and this curious limitation in the planting of shrubbery seems to be due to mental and not financial reasons. The average city or suburban dweller feels that he has performed a noble act when one *Hydrangea* and two *Carolina Poplars* proclaim aloud his lack of individuality, while in the country the same process of mind results, perhaps, in a purple *Althea* and some *Marigolds*. The rural mind ought not to be held responsible for such manifestations of taste, for drudgery of the hardest kind soon kills the æsthetic instinct that almost every one possesses early in life. Country children are often marvels of observation, and, though slow to narrate, they are passionately fond of flowers. In some of the most primitive places the little children make wreaths the livelong day, and garlands often serve the purpose of all other toys. As they grow older the boys' power of observation takes a practical turn, while it is slowly crushed out of the girls, until a new love of the common and distorted replaces the earlier and better taste.

It is the dreadful monotony of country farm-life that retards all movements toward improving conditions, and so long as the great majority of countrywomen on farms spend their lives in depressing drudgery as they do, it is useless to look for any improvement of external conditions. Just so soon as they realize that a "wild" bush like the Arrow-wood is as worthy of preservation as a purple *Althea* or a mildewed *Lilac* there will be a great interest aroused that will tell in every village and country lane.

Harrisburg, Pa.

M. L. Dock.

Entomological.

The Influence of Environment on the Life History of Insects.

IT is not so long since that it was assumed that the life history of an insect being once carefully made out, work with that species was done; and remedial measures once ascertained they need only be restated again and again until all were familiar with them. Acting upon this assumption, which at the time was entirely justified, station bulletins were printed all over the country repeating well-known life histories and well-known means of checking injury. So much of this was done that considerable adverse criticism was aroused, and when some of the entomologists attempted to verify old accepted knowledge, it was objected that there was an unnecessary and undesirable duplication of work. So matters remained for a time, until it was gradually forced upon the worker that his constituents made altogether too many failures to be satisfactory to him or to them. To prove his case he tried his own recommendations, where he had the necessary time and opportunity to do so, and in many instances failed as completely as did his farmer friends. Sometimes these failures

were made by men that had succeeded perfectly in earlier days, in other fields, and they repeated their experiments yet more carefully a second season before they would believe in their own results. Observations carried on during the course of the experiments also indicated an altogether unexpected amount of variation from the published histories of many species, and an astounding difference in the amount of resistance to poisons, either external or internal. It is hardly necessary to go into much detail here; but from all sides come accounts of varying and sometimes contradictory results, which seem to demonstrate the necessity of studying each destructive species of insect in each distinct environment.

The notes on the codling moth by Mr. Card, in the issue of *GARDEN AND FOREST* for August 4th, emphasize that point. Mr. Card refers to Professor Washburn's results in Oregon, but does not mention the more detailed observations of Mr. Slingerland in New York on the same subject. His own observations differ greatly in some respects from those made by the gentleman just cited, and they will not do at all for New Jersey. Observations made in Germany indicate a yet different habit from any observed here, and the situation in California will prove yet different.

Mr. Card places much stress, and rightly, on the fact that in Nebraska Apples blossom, set and even close the calyx cup before the moths appear or the eggs are laid. In New Jersey that is not so. It is almost impossible to find an unhatched pupa in the orchard after the blossoms begin to drop. In our state there is nothing but larvæ to be found in the cocoons until the first spell of warm weather that starts the sap in the trees and induces a swelling of the buds. Then, almost over night, everything enters the pupal stage, and this is usually short—much less than the duration of blooming-time in an Apple orchard. But even in New Jersey differences exist. Near New Brunswick there is positively a single annual brood only. South of Burlington County there is at least a partial second brood, and the practice that would prove perfectly satisfactory in one locality would be distinctly imperfect in the other. The truth is that insects, like all other creatures, adapt themselves to their surroundings, and that their habits, and life histories are different in even slightly different localities. I have never seen the egg of a codling moth on a leaf, and I believe none has been previously recorded. Nevertheless, I do not for a moment discredit Mr. Card's observation.

We have a similar set of experiences with insecticides. Insects which succumb readily to kerosene in the Atlantic states defy it absolutely in Colorado, while we are just as likely to find the food-plant much more sensitive to it. Washes that easily destroy the San José scale in California are ridiculously ineffective in the Atlantic states. This very scale is changing its life history and habits in the east materially in several directions. I will venture the prediction that in half a dozen years it will not be considered a first-class pest in New Jersey, though I would not like to extend this prophecy to localities with which I am less familiar.

The point of all this is that we must begin afresh our studies on the life history of many of our common insects, with special reference to the locality where the study is made. There will be some duplication of labor, but the work will be comparatively easy because of what has been already accomplished. I am certain that in some cases our practice will be completely changed, and some confusing and distracting results will be satisfactorily explained.

It has been too much the practice, perhaps, to consider discrepancies between the results of recent and older observers as proof of the superior accuracy and reliability of the former, but it is worth while to inquire in all cases whether both have not been correct and whether the differences are not due to the varying conditions in the insects themselves and their surroundings.

New Brunswick, N. J.

John B. Smith.

Cultural Department.

A Renewed Outbreak of the Asparagus Rust.

EARLY this spring the appearance of this fungus was noted in GARDEN AND FOREST (see page 236), and since it is a new and alarming enemy, Dr. Halsted has sent out a fresh circular of warning. In a badly infested Asparagus field the plants generally appear as if they had matured unseasonably, and instead of their usually healthy color the field looks brown, as if frosts or insects had robbed the plants of their vitality. When viewed near at hand the diseased plants are seen to have the skin on the stems, large and small, blistered, and in the ruptures of the epidermis dark brown spots can be detected as shown in the figure below. These brown dots or lines are of various sizes and shapes, and remind the close observer of similar spots in the broken skin of stems of grains and grasses and of the leaves of corn, also due to rusts, but not the same kind as that of the Asparagus.

The Asparagus rust is due to a fungus, *Puccinia asparagi* DC., that is, a minute plant consisting of microscopic



Fig. 44.—Portions of Rusted Asparagus Stems.

threads which grow through the substance of the Asparagus plant, taking up the nourishment that is needed, and finally break through the surface to bear the innumerable brown spores that give the dark color to the spots on the Asparagus stems. This is the last stage in the development of the rust fungus, and as such remains over the winter. When the warm, moist weather of spring and summer comes, the spores above mentioned germinate and a new lot of Asparagus plants may become infested.

There are two general methods of checking the rust, namely, by destroying the spores and by preventing their growing upon, and getting a foothold in, the substance of healthy Asparagus plants. The rust fungi are among the most difficult to check—by protecting the plants they feed upon—by means of fungicides, Bordeaux mixture, etc., sprayed upon them during the growing season. While something may be hoped for with the spraying pump, the chief method of eradication lies in the destruction of the many spores. This can be done in a very simple and effective manner by carefully gathering all the parts of the Asparagus plants that are above ground and burning them. It would be a waste of time to stack the tops and leave

them to natural decay; and to place them in manure-heaps would be still worse. The only safe thing to do when a serious enemy like this is in the Asparagus field is to burn the plants, even to the last scrap that can be gathered up. Let this be done at once, for any delay means the breaking up of the brittle, rusty plants, and a generous sowing of the spores upon the ground. If the fire could go over the whole field and burn all the small as well as the large pieces, this would be the best of all.

The Hybrid Gladioli.

SUMMER-FLOWERING Gladioli are now at their best. Fine effects can be made by planting them in groups of one color or by arranging them in lines of separate colors, and their decorative value is thus enhanced. A mixed bed cannot be arranged so well, and the result is often an inharmonious medley. Again, mixed varieties, sold as unnamed seedlings, no matter how much inbred to conserve the type, still revert, and vary greatly in time of blooming.

The direct hybrids and inbred crosses from the first were superior to the types in beauty. The Gandavensis type or section is the oldest and best known. It originated half a century ago as a cross between *Gladiolus psittacinus* and *G. oppositifolius*. Their showy colors and the ease with which they are cultivated made them at once permanently popular. The Brechleyensis, with scarlet flowers, is one of the best representatives of this type. All are characterized by erect, somewhat trumpet-shaped flowers and an upright and close arrangement on the spike. Professor Gibbs is a fine example. It is a handsome purplish pink with a white blotch, and originated from seed sent by Dr. Gibbs, of Newport, to Professor Sargent, of Brookline. Others are John Laing, deep red; Agathe, rose tinted with orange; Feu Follet, white, throat striped with red; Rayon d'Or, straw-colored, with red markings; Snow-white, an excellent variety for florists; Sultanæ, satiny rose. Probably a thousand varieties have received names, and a large number of these are in cultivation to-day.

The finest colors among Gladioli occur in what is known as the Lemoinei section, and the form of flower is also distinct, with the hooded characteristics of one of its parents, *G. purpureo-auratus*, strongly marked. The strongly contrasted coloring, divided as if by lines, makes the most attractive feature. Rich red and yellow shades predominate, but there are frequent shadings of white and pink. The well-marked blotching readily calls to mind some of the fancy French show Pelargoniums. Some of the best are André Chenier, pink, with large satiny black blotch bordered with yellow; Mademoiselle Lemoine, straw-yellow, with purple blotches; Masque de Fer, bright red, lower segments deep maroon, with yellow centre, specially good; E. V. Hallock, sulphur-yellow, large crimson blotch, white centre and border of yellow.

The introduction of *Gladiolus Saundersii* about a dozen years ago brought to the notice of the hybridizer a new large-flowered species, with flat, orange-scarlet blooms and a conspicuous lower segment. *G. Saundersii* is hardier than many of the hybrids, and frequently has endured the winters here. Crossed with some of the hardier species it has given us the Nanceianus section. This, as well as the Lemoinei group, is hardy in Europe, but the corms should be lifted here, though they occasionally stand through the winter. The Nanceianus group is characterized by large open flowers, and many are finely marked. Some of the best are Fred Bergemann, salmon-red; Canrobert, purplish marked, and striped with rose; Charles Baltet, rosy-violet, with white throat; *G. Paul*, velvety crimson, with yellow blotches.

Still another type has originated, known as the Childsi, which is from a cross between *Gladiolus Saundersii* and the Gandavensis hybrids. Thus far it is in the hands of the hybridist, but soon many varieties will be in cultivation.

Gladioli do best in a rich, well-drained soil, and should not be planted more than three inches deep. This has been a favorable season for these plants on light soils. They enjoy abundant moisture when growing. It is better to lift the corms before frost cuts them down, and store them in frames with a little sand or soil over the roots, and they thus ripen gradually and thoroughly and the food stored in the stems and leaves returns to the bulb. Bulblets form about the base of the old bulbs, and when a variety is extra fine it should be marked so that these can be taken care of at lifting time. If planted separately the following spring they will make fair corms the same season. Gladioli are easily raised from seed, with even less trouble than onions. Large numbers of

unnamed seedlings are each year put on the market. This would be well enough if the raisers would take the trouble to flower them and cast aside the worthless varieties. Although some of the finest varieties have come from random crosses, yet comparison with carefully fertilized seed will show a marked difference in the seedlings. There is no doubt that Gladioli and many other summer-flowering roots are much injured in the seed stores by being kept in hot, dry rooms, and they should be stored in a cool place, for much vitality is lost when they are forced into growth before being planted. Early planting is best. If put into the ground in April they will make good roots and not be above the soil before danger of frost is past.

Wellesley, Mass.

T. D. Hatfield.

Sparaxis pulcherrima.

A CERTAIN gentleman always asks me when we meet what I have that is new, meaning in the horticultural line. The next time I shall answer, with much pride, that *Sparaxis* (*Dierama*) *pulcherrima* has kindly blossomed in my garden. I feel much pleased, for I have never seen it elsewhere, and several experts of my acquaintance have given it up as an intractable subject. The only secret, I fancy, is to wait for the flowers until the plant is strong enough to produce them, and the treatment I have given has been of the simplest kind. I raised the plant from seed about six years ago and kept it for two years in a pot, but, finding the growth slow and unsatisfactory, I turned it out into the open ground near my *Ixia*-beds, and there it has been ever since. Its foliage remains fresh and green until the end of November, when I cut it off near the ground and cover the roots with four inches of Pine-leaves. In the spring the new shoots appear about two weeks later than the *Ixias*, a tardiness which once caused me to report in this paper that the winter had killed it.

The narrow foliage, in appearance much like a Sedge, attains a height of about two feet. The flower-stalks would be five feet high if they stood erect, but the weight of the flowers causes them to arch over in a graceful curve. Besides the chief cluster at the ends of the stalks, which open first, there are numerous spikelets, each with from five to eight flowers of the same bright violet-crimson color hanging at regular intervals. As the terminal blossoms drop, the stalk assumes a semi-erect position, which, of course, causes the spikelets to arch during their time of blooming, and, as the seeds in the terminal capsules become large and heavy, the main stalk is again brought down in an arch. The swaying of the stalks with every breeze adds much to the attractiveness of the plant.

Canton, Mass.

W. E. Endicott.

Some August Flowers.

ASCLEPIAS INCARNATA, a native Milkweed, with light pink flowers, makes a good display when grown in a garden. It is somewhat umbrella-like in form, the top covered with flowers, and these are borne for about six weeks during July and August. In damp places, near creeks, where it is often found, it is not uncommon to find plants with flowers almost white.

Dicentra eximæa is one of the most constant blooming of herbaceous plants, and is in flower from early summer until late in autumn. The flowers are purplish rose, not a striking color, but its ever-blooming character is a great point in its favor. In the same list may be placed *Callirrhoe involucreta*, with bright rose-colored flowers, and *Origanum vulgare*, rosy purple. Both of these plants are constantly in bloom. The *Callirrhoe* is an almost prostrate plant, while *Origanum* reaches a height of two to three feet.

Daphne cneorum, whose sweet-scented flowers are so numerous produced in early spring, is abundantly full of blossoms now. In fact, it is rarely without flowers at any time during the season, and they become more abundant in late autumn. It delights in a rich, sandy soil.

Germantown, Pa.

Joseph Meehan.

Heliopsis Pitcheriana.—This plant, of which the English garden papers speak highly, is plainly but a selected form of *Heliopsis lævis*, as self-sown seedlings at once revert. For years it has been one of our worst weeds. It is hard to kill, crowds and robs other plants to their exclusion, and is fit only for the roadside. As a decorative plant it is not nearly as handsome as our common *Rudbeckia hirta* or *Coreopsis lanceolata*, which here has strayed from the borders and keeps it company.

Wellesley, Mass.

T. D. Hatfield.

Correspondence.

Arsenate of Lead with Bordeaux Mixture.

To the Editor of GARDEN AND FOREST:

Sir,—I was somewhat surprised this year in making a test of a combined fungicide and insecticide—arsenate of lead and Bordeaux mixture—to find that both foliage and fruit of Crab-trees, to which it was applied, were seriously injured.

I used four pounds each of copper sulphate and lime to each forty-five gallons of water, and to this added four ounces of arsenate of lead. Three applications were made. The amount of injury increased with each application from "slight," "considerable" to "severe," and consisted of a burning of the foliage; a rusting and scarring of the fruit. Arsenate of lead and Bordeaux mixture applied separately to adjoining trees produced no injurious effects. I should like to know if similar results have been noted by other experimenters.

Central Experimental Farm, Ottawa, Canada.

John Craig.

The Codling Moth.

To the Editor of GARDEN AND FOREST:

Sir,—Professor Card's article on this subject in your issue of August 4th is a most timely and valuable one. This year, in the Mesilla Valley, New Mexico, I have been trying various measures for the destruction of the codling moth, after becoming convinced that mere spraying, as ordinarily recommended, was of very little avail. The rate of increase in this warm climate is prodigious. The moths from over-wintered larvæ emerge with us as early as April 24th. The second generation of moths, or rather the moths of the first lot of 1897 larvæ, appeared at the end of June. By the end of July another cycle was completed, and for the third time moths were on the wing. The young larvæ of the third generation of this summer are now (August 9th) in the apples.

At the end of March we had the test orchard well searched for hibernating worms. Great numbers were found under loose bark, but the places where they most congregated were cracks in dead wood or old stumps. All such cracks should certainly be stopped up with wax. The worms were destroyed to a considerable extent during the winter by woodpeckers, and a Clerid larva also devoured them. We found many more worms in the apple cellar belonging to the orchard than on the trees; such places should always be searched. Toward the end of May the wormy apples were picked off the trees, as far as they could be found, and destroyed. About 14,000 wormy apples were found on 650 trees. The apple crop was a large one, and the injury done by the first brood was not of the slightest consequence. On June 2d, when the picking was finished, it was found that the part of the orchard which had been sprayed was about as wormy as the rest.

By banding the trees we have caught great numbers of the worms, but they are gaining on us, nevertheless. It will not be possible to estimate the results of the work done until the end of the season, but the outlook is certainly discouraging. I find no hymenopterous parasites of the worms here, though some die from the attacks of the fungus *Sporotrichum*, especially in confinement. Certain orchards which had no apple crop last year, owing to late frosts, show this year comparatively few worms, even when no measures have been taken to prevent the attack. We seem to have obtained good evidence that the moths do not ordinarily fly any great distance, but lay their eggs on or near the trees on which they bred.

Mesilla, N. M.

T. D. A. Cockerell.

The Elm-leaf Beetle.

To the Editor of GARDEN AND FOREST:

Sir,—Referring to the communication by Professor Britton in last week's issue of GARDEN AND FOREST, if spraying is thoroughly well done, a season can be occasionally passed, provided there are not too many sources of infestation in the immediate vicinity. Nevertheless, trees will be considerably injured by omitting even a single year's work under ordinary circumstances, as the state of affairs in New Brunswick during the present season will illustrate.

During the early part of 1896, Elm-leaf beetles were excessively abundant, and a large proportion of the trees in the city were defoliated. Considerable spraying was done by the City Improvement Society, and trees treated under their direction were generally in fairly good condition. The trees on the College Campus were treated, as usual, with arsenate of lead, and remained in good condition throughout the season. During the early part of July, when the larvæ were about full

grown and ready to pupate, a period of peculiar weather favored a disease which attacked the larvæ and pupæ to such an extent that only scattering beetles here and there escaped. It was a true epidemic disease, and so fatal that it was almost impossible to get together a small collection of adult beetles for which I was asked by a correspondent. Very few beetles were seen during the winter in their ordinary hiding-places, and the janitors of the College buildings informed me this spring that where they had been in the habit of sweeping up quarts in previous years, they then saw only an isolated beetle here and there. So few beetles were seen early in the spring that I decided to omit the first spraying of the trees on the College Campus, and so few eggs were laid that, as an experiment, I decided to omit spraying altogether. When the larvæ hatched, however, it was seen that there were a great many more insects than had been counted upon. The trees on the Campus remained in fairly good condition, although some branches here and there showed a considerable proportion of eaten leaves; but in other parts of the city European Elms showed just as much injury as they had manifested during previous years. Under ordinary conditions, thorough spraying will kill a very large percentage of the insects that would otherwise come to maturity; but even under the best treatment a small percentage will survive, and that percentage will be sufficient to stock the trees during the season following. We have only one brood of the insects in New Brunswick, and in times past we have not found two annual sprayings any too much to keep the insects in check on the trees surrounding our institution.

I consider it a poor plan to adopt the suggestion that only one-half the trees in a city be sprayed each year; but on the other hand, I think that if one part of the city was thoroughly sprayed twice one year it could be protected by a single spraying the second year. The recommendation is always to make a spraying when the adults appear, so as to prevent them from laying eggs as far as possible. The second spraying should be made when the eggs are all hatched, to kill the larvæ and prevent their development to beetles. If that be done thoroughly one year it would be necessary the year following to make only the second spraying to kill off the larvæ. In a season like the one through which we are now passing, the Elm-trees support insect injury very well, because there is an abundance of moisture to enable them to repair damages. I fully expect that spraying will have to be thoroughly done on the trees near our buildings next season, because there have been many more beetles developed this year than were permitted to come to maturity for several years past, when active measures were taken.

Rutgers College, New Brunswick, N. J.

John B. Smith.

Critical Notes on the Loganberry.

To the Editor of GARDEN AND FOREST:

Sir,—It has been a good season to discover imperfections in this new fruit as grown here in the east, and we have a short list of them to record. It is possible that some of these may be false accusations, and that when we understand the peculiarities of the plant better we shall know that they are the result of improper treatment, rather than natural traits, but for the present it is only fair that they should be noted as faithfully and given as much publicity as the good qualities that were observed last year.

First, all of the canes that were not covered last winter winter-killed nearly to the ground.

Second, the canes that were covered with earth about the middle of January were apparently injured considerably before that time, but the plants that were covered about the 20th of November wintered admirably.

Third, even where the canes were not injured, the fruit did not mature well this year. There was every indication that the few plants that we had would yield a large crop of excellent quality, until about the middle of June, or when the earliest berries began to turn red; then it was noticed that the leaves on the fruiting canes were blighting, and later this developed into a blast that extended to the berries, and they began to show brown spots, which, upon examination, proved to be where the pulp had dried down upon small groups of seeds, and usually it was the seeds near the hull at the base of the berries that were affected. This trouble was attributed to the excessively wet weather, and this theory is supported by the fact that Black Cap and other early Raspberries appeared to suffer severely from the same cause, although they showed the effects differently.

Fourth, some of the Loganberry-plants seem to be either diseased or to lack constitutional vigor. The leaves of such plants are small and light-colored and the growth puny, while

other plants growing beside them are exceedingly vigorous. We have noticed these plants in every lot of the Loganberry planted, and have not been able to find a satisfactory reason for their condition. So far as observed by us, such plants never amount to anything.

The young plants propagated from hard-wood cuttings last winter have exceeded our expectation in vigor of growth. Already they have outgrown the seedlings of the same age, and are hard in pursuit of the stolons that started into growth much more freely than they did in the spring.

We still are inclined to believe that the Loganberry may be profitably grown for market in New England, at least in small quantities, although we are free to confess that we are disappointed in the behavior of the plants here this season.

Rhode Island Agricultural Experiment Station.

L. F. Kinney.

Electricity in Vegetation.

To the Editor of GARDEN AND FOREST:

Sir,—There is little doubt that nature makes an important use of electricity in the growth of vegetation, the blossoming of flowers and the ripening of fruits. The method of electric appropriation and action is as yet not fully understood, but the secret will be revealed to man during the coming years. Just as science is proving that the nerves of the human body show polarity under the action of electric currents, so it is shown that there are currents of electricity in all parts of vegetables except those which are insulated with dry bark, etc. In flowers the currents are more feeble, but in the succulent fruits and certain cereals they are of considerable strength, depending upon the season, being greatest in spring-time when the plant is rich in sap.

Atmospheric magnetism is seen in tree-growth. Branches on the edges of groves are drawn outward by the electrical attraction of a highly oxygenated atmosphere and that of the unshaded earth. Artificially electrified soil increases plant-growth, as every one is aware. Some curious experiments have already been made in electrical-plant culture, and results have been obtained which warrant their continuation, although they have not yet reached that point of permanent scientific development which insures a fruitful transformation of fields and market-gardens by means of artificial electrical stimulus.

It has long been known that fruits exhibit electrical conditions, and that in puncturing them at their electrical poles and closing the circuit, it has been possible, by means of special mechanism, to study the magnetic variation. The ascending sap of trees and the cortical sap (which, as is well known, have not the same chemical composition) react upon each other, giving marked electrical phenomena. From the pith to the cambium the envelopes are electrically less and less positive; from the cambium to the epidermis they are more and more so.

What is to be the future of patient experimentation along these lines? Already in hot-houses fruits are forced by strong electric illumination. Possibly by reinforcing this external action with the passage of an electric current in soils charged with chemical products marvelous results shall be obtained—fruits and flowers magically improvised, forests created as by a fairy wand out of denuded deserts. Such improvisation has nothing improbable about it in view of the experiments which have already shown the mysterious and powerful influence exerted by electricity and magnetic currents upon vegetable life.

Chicago, Ill.

Rosa G. Abbott.

[A pleasing speculation—but prophecy is quite unsafe.—
ED.]

Recent Publications.

An Illustrated Flora of the Northern United States, Canada, etc. By Nathaniel Lord Britton and Hon. Addison Brown. Vol. II. New York, 1897.

The second volume of this notable work completes the Choripetalæ and includes the Gamopetalæ through Menyanthaceæ. The success which it has attained justifies the wisdom of the great undertaking. As an exposition of views that are undoubtedly gaining ground it must needs take a peculiar place in the future study of the flora with which it deals. Whether these views will meet with general acceptance in their entirety or not, it is an advantage to have them so ably presented. If the analytic as opposed to the synthetic method of treatment of plant forms seems sometimes carried to the extreme, we cannot close our

eyes to the fact that such tendency is encouraged by the recent increase of active field study, the lack of which in the past has undoubtedly left regrettable marks on our botanical literature. Though the general outlines of the flora of a new country must necessarily be drawn from closet study, the details cannot safely be left to that alone, and the success achieved by some of the newer hands in the elaboration of our eastern flora, largely due to careful field investigation, should be gratefully acknowledged. Some of the best results of such study find place here for the first time in a general work.

We again express our pleasure at seeing our plants arranged in a sequence so much preferable to the accustoming one, and their descriptions accompanied throughout by figures. Some of the latter leave much to be desired, but most of them are fairly excellent and must be of great service to those for whom they are intended—that is, the unprofessional students who need confirmation of their determinations made from descriptions. It is not fair to expect elaborate illustrations under the limitations enforced by the plan of this work or that the specialist should always find them adequate.

Notes.

We recently received some specimens of the new black cherry, the Dikeman, from Mr. S. D. Willard, of Geneva, New York. The fruit was picked on August 16th and was in excellent condition when it reached us, nearly a week later. It is of good size, remarkably firm and very sweet; indeed, it would be better with a little touch of acid. It is certainly the finest cherry we know which ripens so late.

The Black Locust is a common tree in West Virginia, where it is found in groves of considerable extent and is of great commercial value on land that has been allowed to revert to forest after having been used for agricultural purposes. In the late annual report of the West Virginia Experiment Station, Professor Corbett says that it is considered of greater value than any native wood for use as driving blocks in sinking points for driven wells. The timber closely approaches in value that of Red Cedar for posts, and this, together with its rapid reproduction, constitutes its greatest value, although it is much sought for by the manufacturers of hubs for carriage wheels and for other uses where great resistance to pressure is required. The largest Black Locust in West Virginia stands near the entrance of an abandoned coal mine, not far from Morgantown. It is a remarkable tree, being fully four feet in trunk diameter and at least one hundred feet tall.

The section of Florida adapted to the open-air cultivation of the Pineapple on the east coast and in the middle of the peninsula is mostly on ground that northern farmers would consider barren sand dunes. Nevertheless, there is much good plant-food in the soil, and good Pineapple land near West Palm Beach, for example, costs from \$150 to \$250 an acre. Plants of the red Spanish variety cost something like \$4.00 a thousand, and from eight thousand to ten thousand can be grown on an acre. It is found advisable to set them close together so as to suppress weeds and prop up each other's fruits, for if set wider apart the fruits are inclined to grow large, topple over and become sunburned on one side. A correspondent of *The Country Gentleman* states that good suckers will fruit in twelve months after setting. Plants set in August or September will give a good half crop the following May and June. The open-air pineries of the Indian River do not, as a rule, produce more than a hundred standard eighty-pound crates to the acre, but they will keep this up from three to six years without renewing. If the grower nets from \$1.50 to \$1.75 a crate he is doing well. Of course, this is no price for fancy pineapples under glass.

Within the past fortnight 207 carloads of California pears, peaches and plums, with a few grapes and nectarines, have been sold in this city. And, of course, this large quantity is only supplementary to supplies of the same kinds of fruits from eastern, southern and middle-western states. On Monday of last week, for example, thirty-three carloads of California fruit were sold, the largest amount ever disposed of here in one day. During the same week peaches from eleven other states formed part of our supply, so that it is not surprising that very low prices were the rule for the showy but less luscious California peaches. The best freestones from the Pacific coast have been selling here for seventy cents a box,

while many have brought but forty-five cents, and, contrary to general experience, clingstone peaches, because of their large size and showy color, commanded higher prices. Seckel pears were a small part of these shipments, along with the handsomest Bartlett's ever offered in our markets, and as much might be said for the plums now in season.

According to a correspondent of the *Evening Post* the army of pickers that descends upon the Cranberry bogs of Wisconsin every autumn is composed chiefly of Poles, Indians and half-breeds, the Indians being considered the best pickers because they never strike and always accept the prices offered by the overseers. As a rule they earn a dollar a day and their board. They bring their lodges and tepees with them and camp on the field. The Indians will not begin to work until half-past nine in the forenoon and they promptly knock off at four in the afternoon, in spite of persuasions or threats. This peculiarity sometimes proves costly to the growers, for if a killing frost is threatened in the night the owners are compelled to hurry about and hire more white pickers, since it is a waste of time to try to get an extra hour's work out of an Indian. He would see the whole field frozen stiff first. At such times the Poles realize the advantage of the situation and demand extra wages for overwork. The Indians are good weather prophets and serve a useful purpose in foretelling when to prepare for frost, and when the word issues from the lodge of a chief that frost is approaching the bogs are immediately flooded and extra help is employed. If the water covers all the berries in time no damage happens, but those that are left exposed will be ruined.

Some investigations by Mr. A. F. Woods, of the Division of Vegetable Pathology in the Department of Agriculture, seem to indicate that the so-called "bacteriosis" of Carnations, first described by Dr. Arthur in 1889, is not due to bacteria, but is a direct result of injuries to the plant by thrips or aphides. In a paper read at the recent meeting of the American Association for the Advancement of Science, Mr. Woods brought out the fact that neither fungi nor bacteria are present in the earlier stages of the disease, and that their presence is not constant as the disease advances. A disease with all the characteristics of this bacteriosis, excepting the presence of bacteria, can be produced by aphides, and since the injuries in their earlier stages are not accompanied by bacteria, the aphides cannot be charged with carrying any infectious germ. The Carnation is readily influenced by extraneous conditions, and the reaction to the injuries of aphides and thrips vary largely, and plants carelessly grown suffer more seriously from punctures by the aphids than vigorous plants do. The sum of the matter is that the greatest care should be used in selecting and propagating stock, in furnishing conditions for vigorous growth and in keeping down aphides and thrips. It is these insects, and not bacteria, with which the practical grower must contend. Of course, good stock and good conditions of growth can never be neglected, and Mr. Woods' investigations give emphasis to what growers already know—that the disease is often the result of neglect, and that the way to have healthy plants is to give the closest attention to every detail of culture.

Many Orchids which grow and flower luxuriantly for some time after their importation gradually fall away and ultimately die. Various theories for this degeneration have been put forward, but the puzzle remained unsolved until now, when some experiments in France, reported in a recent number of *The Orchid Review*, seem to give a satisfactory explanation. Flowering is an exhaustive process, and investigations were made with *Cattleya labiata*, which produces many flowers and is grown in a mixture of Fern fibre and sphagnum, which contain little nutriment. The *Cattleya* was analyzed chemically in 1891 when it was imported, and a similar analysis was made of plants in 1897 after six years of cultivation. The results given in comparative tables show that the latter plants contained less dry material, less organic matter, potash, lime, magnesia, phosphoric acid and nitrogen, while water, sulphuric acid and two or three other substances, which were only present as traces in the imported plants, have increased. This analysis seems to show that the degeneration is attributable to exhaustion caused by the production of flowers without any means taken to compensate the plants for loss. The conclusion arrived at is that in order to counteract this exhaustion, *Cattleyas*, at least, should receive a mixture of suitable fertilizers containing nitrogen, phosphoric acid, potash, lime and magnesia. All this means that Orchids are subject to the same laws as other plants; that we cannot go on cropping without supplying food. But just here the question to the practical Orchid-grower comes, How shall these elements be most successfully applied?

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Harmony in Small Country Places.

IN planting the ornamental grounds of a small country place a wise choice of material is just as important as a wise decision with regard to the needed amount of foliage and its proper distribution. Of course, almost all of Nature's products are beautiful when considered in themselves; but now that the resources of all climes and countries are at the planter's command, he may so combine and contrast beautiful plants that their collective effect will be displeasing.

The most important quality to obtain in ornamental grounds is unity—harmony of general effect. And, in one sense, it is very hard to obtain, for it means much self-denial. Horticultural interest develops with its exercise. Year by year the planter is tempted to introduce more and more kinds of plants within his gates, as his knowledge of their variety and his appreciation of their different kinds of beauty develop. If his place is very large he may somewhere find a good chance to indulge all his likings. But on a small place formal avenues and graceful groves and clumps of trees of many sorts, peaceful lawns and varied shrubberies, orchards, flower-borders, rose gardens, pineries, arrays of native flowering-plants, and collections of showy exotics cannot all be secured without detriment to the effect of each group and fatal injury to the effect of the place as a whole. Many things in themselves desirable must sternly be refused admittance if the most desirable of all possible things—restful harmony in the general result—is to be achieved.

Given a small place, the best course for the owner to pursue is, first, to decide whether he has so strong a desire for a collection of any special sort that he positively cannot do without it. If he decides that he has, he should reserve for it the spot where it will interfere least with the effect of the rest of his grounds. And then he should sacrifice his desire for collections and specimens of other sorts and simply endeavor to make the remainder of his grounds beautiful.

In prosecuting this aim the best test will be the question: Will the result please the eye of a cultivated person who is not a horticulturist? Will it, for example, please the eye

of an artist? This is the only right result to secure in the grounds immediately about a dwelling-house. If they are given up to the indulgence of special horticultural tastes they may prove very interesting to examine, but they will not be beautiful as a picture. And the environment of a home should always be a charming picture of one sort or another.

If this truth has been accepted, and if, as was indicated in a former article, the owner has decided where his thicker plantations shall be made, and where his more isolated trees and shrubs shall be set, still he is not ready to begin actual work. He must decide what kinds of trees and shrubs and flowering plants he will use to produce his artistic little landscape. If any conspicuous plants of Nature's growing already occupy his ground, the proper character of his scheme is indicated thereby. Nothing should be introduced which is out of harmony with them, and the most harmonious things are likely to be those which Nature has associated with them in this same part of the world. No rule, however, is more generally ignored than this. The more definitely Nature has laid down the path which the planter should follow, the more likely he is to wish to escape from it. If his grounds are altogether bare, he may be satisfied to set out native Maples, Elms, Pines or Hickories. But if some of these already grow inside his fences he is pretty sure to seek the nurseryman and inquire what he can offer that will add "variety" to his place. Thus we may discover the genesis of those unfortunate agglomerations of inharmonious trees, shrubs and flowering plants which so often distress the careful observer of American country places. Monotony has been feared; variety has been desired; an artistic medley is the result; and very often it is of a glaring kind, including profuse displays of plants which bear foliage of some abnormal hue, red or yellow or purple, bluish or whitish, blotched or streaked, or which grow in abnormal forms, weeping or pyramidal, prostrate or umbrella-shaped. Even a single plant of any such sort should not be introduced into our plantations without great care. But if many are employed the effect cannot be good, no matter how much care is taken. Simplicity, restfulness, naturalness, harmony—these are the great requirements, and all of them are sacrificed when many eccentric, abnormal, or even very showy plants are introduced. Many a small place which has been filled with these at great expense is an offense to the eye of the artist, and all the more so if dignified trees or beautiful shrubs of native growth raise their heads amid the medley. And, moreover, real variety is not thus achieved. While each place is a medley in itself, each one resembles its neighbor, for the owners of all have been guided by the same mistaken ideas and followed the same mistaken path.

Variety is indeed desirable in our pleasure-grounds. They should not be individually monotonous; they should not all resemble each other, and they should not look like bits reserved from pre-existent meadows or cut out of pre-existent forests, no matter how beautiful these meadows and forests may have been; they should all reveal the touch of art, and each of them should have its individual, personal charm. Nevertheless, a study of the native forest and the neighboring meadow, brookside and glen will afford the best possible patterns for the effective and varied as well as for the harmonious planting of our pleasure-grounds.

Among the hills and valleys and higher mountains of northern New Jersey and southern New York, for instance, many colonies of summer residences have been established in recent years, many fine large country places have been laid out, and the suburbs of many towns show streets of pretty cottages or expensive villas. Nowhere has Nature been more lavish with the beauty or with the variety of her gifts than in these regions; yet nowhere can more pitiful, or pitifully costly, mistakes in the way of planting be discovered. Hundreds of villa grounds and small places may be examined, and very few be found which are not deformed by a profusion of eccentric exotics or garden varie-

ties, and scarcely one in which an intelligent attempt has been made to secure variety in the right way. When the plantations are not varied in the wrong way—in the heterogeneous way—they are monotonous and uninteresting. Yet every acre of the "unimproved" countryside is filled with suggestions how to secure variety in the right way—in the harmonious way.

We have in mind, for example, a certain thickly wooded region where many summer homes have been recently established. Its forests are diversified as only American forests can be. But their predominant trees are Maples, Hickories, Chestnuts, Beeches, Hemlocks and Oaks of several kinds. In consequence, where the native growth has not been obliterated in the neighborhood of a house, these are the trees which most often have been preserved. Naturally, a certain monotony of effect would ensue without further planting; and, therefore, almost every owner has sought to relieve it by introducing striking exotics and abnormal garden varieties of trees and shrubs. If the intending planter would study the borders of the neighboring forest it would supply him with variety enough. Here and there he would find the Yellow Birch, with its beautiful bark and delicate leafage; the Tupelo, with its dark and shining leaves and picturesque habit; the Dogwood, with its unrivaled sheets of blossom; the magnificent Tulip-tree and dignified Basswood; the Red Cherry, with its burden of gleaming fruit; the Hop Hornbeam, with its pale green tassels of seed; the Sassafras, with its leaves of peculiar shape and varied tones of green, and the White Pine, so softly symmetrical in youth, so splendidly picturesque in age. These are the secondary trees of the forest in this particular region. None of them is able to reach its most beautiful development beneath the denser shade and amid the stronger arms of its more prominent associates. But any one of them, if planted where it would have room to spread and preen itself in the wind and the sunshine, would be much more ornamental than the Swiss and Austrian Pines, the Colorado Spruces, the European Maples, the Copper or Weeping Beeches, the cut-leaved Birches, the sickly-looking striped Negundos, the piebald Retinosporas, the golden Elders, or the stiff Altheas which have been profusely planted in their stead in the pleasure-grounds of the neighborhood. And, of course, the general effect of a place adorned with them as companions for the larger trees of native growth would present an harmonious effect which is now the very rarest merit that characterizes a small American country place.

William L. Bradley.

THE recent gift of twenty thousand dollars to Harvard College by Miss Abby A. Bradley in honor of her father was briefly noted in these columns a few weeks ago, when it was stated that the income of this endowment, to be known as the William L. Bradley Fund, is to be expended by the Director of the Arnold Arboretum to advance the scientific knowledge of trees. At the request of President Eliot, of Harvard, a sketch of the life of this energetic man was prepared by Miss Bradley, and as showing something of his enthusiasm for the subject which the fund commemorates, we publish the sketch now, with Miss Bradley's permission:

William L. Bradley, late of Hingham, Massachusetts, was born in Cheshire, Connecticut, May 25th, 1826. His father, Levi Bradley, was a prosperous farmer of Cheshire, and the son lived on the farm until the age of thirteen, when he entered mercantile life.

An unusual interest in agricultural pursuits determined his career. His attention having been attracted by certain discoveries in Germany of a method for producing chemical fertilizers, he decided in 1860 to embark in this new and undeveloped enterprise. Many years were spent in laborious research in the laboratory and in experiments in the factory and field before the business was profitably established. But by force of high character, an indomitable will and great business sagacity, in face of obstacles which would have daunted

a nature less resolute and far-seeing, he successfully founded the manufacture of chemical fertilizers in this country, and built up a business which during his lifetime became the largest of its kind in the world. He was also one of the first to enter the phosphate mining industry. In the early days of the first mining in South Carolina, and later in the more recent discoveries in Florida, he was one of the largest investors and one of the most progressive operators.

With a decided natural taste for the cultivation and improvement of the soil, he had also a great love of the beautiful in nature, with an especial fondness for trees. As a boy on his father's farm he spent much time alone in the woods and studied their various forms and habits. There was no tree or wayside shrub of that neighborhood which he did not know.

At the age of twenty-five he was able to own a large tract of land in Meriden, Connecticut, where he then lived. This land he improved extensively, draining, laying out roads, planting trees and carefully guarding the woodland. The possession and improvement of land, as years went on, became the recreation and passion of his life. He owned large tracts in nearly every Atlantic state from Maine to Florida. Among other farms, he owned a half interest in Montpelier, President Madison's beautiful estate in Virginia. The old manor house was repaired and made habitable and the exhausted land was brought into a high state of cultivation.

But it was during the later years of his life, at Hingham, when he had partially laid aside the cares of his great business, that he chiefly indulged his taste for planting trees, laying out roads and for the various occupations of landscape-gardening. Trees were planted along the roadside bordering his estate and thousands on the open lands. A large nursery of evergreen and deciduous trees was established. The wooded land on this estate was his especial delight, and many precautions were taken to guard it from fire or injury. Any particularly fine tree was brought into relief and given every opportunity to develop, while the shrubs were carefully preserved, and hundreds of native growth were transplanted. He entered into this congenial pursuit with the same energy and enthusiasm, and with the same breadth of spirit, that distinguished his business career.

It was here amid the work he loved so well, and with many plans for further improvement still unmaturing, that he was stricken with his last illness, and died December 15th, 1894.

The New View of the Hortulana Plums.

WHEN in 1892 Professor Bailey proposed the species *Prunus hortulana* to include the Wild Goose Plum and its nearest relatives, it was at first a relief and afterward a puzzle to horticulturists. It was a relief to have these anomalous forms separated from *Prunus Americana* and from *P. angustifolia* where they had previously caused confusion; and it was gratifying to have them separately characterized, even though it was very difficult to make the specific description fit all the varieties. But to maintain a description for the species which would fit all the varieties has been an ever-growing puzzle. And thus a second time Professor Bailey has brought us relief by his decision* that this is "a mongrel type of Plums, . . . no doubt, hybrids" of *Prunus Americana* and *P. angustifolia*.

This new view of the Hortulana Plums seems likely to find much readier currency among pomologists than did the distinct species view. Indeed, some reputable horticulturists have never accepted the separate species notion; and no two anywhere or at any time have fully agreed upon the varieties which were to be referred to the species.

These cultivated varieties present an inextricable confusion of closely graded differences of character passing without a break from *Prunus Americana*, through the Miner group (Bailey's *P. hortulana*, var. *Mineri*), then through the Wild Goose group, and by way of such varieties as Schley, Clifford and Macedonia into the true Chicasaws. There is absolutely no line of demarcation, however dim, among these varieties. Such a series of forms cannot be conveniently doled out into species, even when we take the most advanced evolutionary view of what constitutes a species. But as soon as the Wild Goose group is understood to be a company of hybrids the matter becomes

* L. H. Bailey, *Cornell Exp. Sta. Bull.*, 131, p. 170, March, 1897. See also *Bot. Gaz.*, Dec., 1896, p. 461.

comparatively clear. We can easily believe that there have been numerous independent hybrid origins followed by still more numerous secondary, tertiary and quaternary crosses, and these would account fully for the extraordinary variability and wide diversity of characters among these Plums. The varieties of the Miner group may reasonably be supposed to be secondary hybrids between Wild Goose types and *Prunus Americana*; or they may be, in some instances, primary hybrids in which the *Americana* influence has preponderated. Such varieties as Ohio Prolific, Schley, Texas Belle and Wooten may be supposed, on the other hand, to be secondary hybrids between Wild Goose and the Chicasaws.

All this will drive every Plum student, pomologist or botanist to a conclusion which we ought to have reached independently before, namely, that no full classification of our cultivated varieties can be made which shall be satisfactory to everybody. It is a matter of unquestionable convenience to divide our multiform varieties into several groups, but the lines between these groups are purely imaginary and arbitrary, and certain varieties which come near the division-line somewhere may be put into one group by one man and into the other group by another, and both men be right. It is all a matter of judgment, and a very delicate matter, too. There has already been too much controversy over some of these doubtful varieties. What plum students need now is less controversy and more patience.

The cultivated Hortulana Plums may be best understood by arranging them in four groups. Three of these have been mentioned—the Miner group, the Wild Goose group and the Schley or Clifford group. These form an unbroken series from *Prunus Americana* to *P. angustifolia*. There is a fourth group at present classified with the Hortulanas, but comparatively distinct from the others. This group is made up of such varieties as Wayland, Moreman, Golden Beauty, Reed, Leptune, Kanawha and others. I may be able to add a word concerning this group at another time.

University of Vermont.

F. A. Waugh.

Cruelty of *Asclepias*.

THE Butterfly Weed, *Asclepias tuberosa*, is one of the most conspicuous plants in the Pines, and the flowers are seen all summer long on the different plants which peep out from under hedges and other shady places. The flowers vary in color from the deepest orange-red to pale yellow, and unlike the other species this plant has no milky juice. Another common species, *A. obtusifolia*, is quite different from *A. tuberosa* in its power to capture and hold insects until they die. Some of the other species have the same power in a more limited degree, but *A. obtusifolia* is by far the most cruel member of the family. The hoods surrounding the stigma which contain the nectar are comparatively short in this species, so that insects probing for the nectar often make a mistake and strike the cloven gland from which the pair of pollen-masses are suspended. Honeybees are the most common victims, and sometimes they are caught by the feet and sometimes by the proboscis. When caught by a foot in its struggles to free itself it often strikes another gland on the same or on an adjacent flower, when its frantic efforts increase until each foot is held as in a vise. The gland seems to be sensitive and to close more firmly about its victim the more it struggles, but if this is true it does not relax its hold after the insect is dead, as sensitive glands usually do. It requires careful work to extricate the insect in order to find just how it is caught. The pollen-masses are something like an old-fashioned pair of saddle-bags and hang by black-looking threads joined together at the summit, where it is attached to the gland which holds the insect. On loosening and pulling out this gland it brings with it the curious pollen-masses, and the foot or tongue of the insect is always found fast in the opening or slit of the gland, which seems to have closed around it. It has long been known that

the pollen-masses were liberated by the agency of insects, but why so many should be held prisoners and tortured in this cruel manner is one of the mysteries of plant-life. Not only bees but many small handsome butterflies are caught by the tongue and held until they die, and sometimes, but much more rarely, large beetles are caught. In one instance I found the large white-lined Saperda, the parent of the Apple-tree borer, held by three different flowers, and strong as this beetle is it was unable to free itself and so died. It is not at all uncommon to find Rose-bugs made prisoners.

The Swamp Milkweed, *Asclepias incarnata*, has this power to a certain extent. A few days ago several stems of this plant, with their numerous umbels of small pinkish flowers, were brought from the woods for class purposes and set on the porch in a jar of water. I soon noticed a strange fly flitting about them, the size of the common house-fly, but with a proboscis which could probe to the bottom of the hoods so as to reach the honey. It was probably some species of Chrysops, as it closely resembled the Golden-eyed Chrysops which sometimes so persistently flies about our heads in its effort to bite. But this species, although it had a wicked-looking proboscis, never attempted to bite, and its sole business was with the flowers. A score or more were about the plant, jostling each other in their eagerness for the unrifed flowers, so it seems that this fly is the main instrument in perpetuating this species of *Asclepias*. Occasionally a fly was caught by a foot and held for a moment, but usually it escaped, and it had done the work of extricating the pollen-masses from the cells so the stigma could be reached.

I have not studied this plant in its home in the swamp, but here on the porch this fly was the only visitor. I placed a jar of *Asclepias tuberosa* by the side of *A. incarnata*, and soon several butterflies and other insects alighted on the former, while they passed the latter by, or merely hovered over it for a moment without alighting. A fine *Danais* butterfly came and sipped the nectar from *A. tuberosa*, scarcely deigning to notice *A. incarnata*, and yet she must have alighted on the plant in its home long enough to leave her eggs, for two of her baby caterpillars were feeding on the stems. It is remarkable that this butterfly recognizes all the species of *Asclepias* and makes use of them as food-plants for her children; for example, in appearance and in texture of the stems and leaves *A. tuberosa* is totally unlike *A. obtusifolia*. The two species seem to have nothing in common except the flowers and seeds. *A. tuberosa* has small green leaves without milky juice, while *A. incarnata* has a copious supply of the milky fluid, and yet before they bloom our butterfly knows the plants and uses them as food for her young.

As butterflies and wasps passed *A. incarnata* by, so the fly paid no attention to *A. tuberosa*. It knew without making the attempt that it could never reach the nectar at the bottom of the long hoods of this species. In my limited study of the Swamp Milkweed I did not find but one fly that it had killed and this was held by one foot. On extricating it I found the foot fast in the gland in the same way that *A. obtusifolia* holds its victims.

Vineland, N. J.

Mary Treat.

Notes from Santa Monica Forestry Station.

CONSPICUOUS among summer-flowering Eucalypti growing here are the following:

Eucalyptus citriodora, or more correctly, *E. maculata*, var. *citriodora* (F. von Mueller), the lemon-scented Gum-tree. This is an erect, straight-stemmed tree, of rather slender and decidedly elegant habit, sparingly branched, but with numerous long, drooping branchlets, often over ten feet in length. The leaves are long and narrow—lanceolate-falcate in shape, nine to twelve inches long, and one inch broad at the widest part, tapering gradually to a blunt point. They are bright green on both sides, with a conspicuous midrib, yellowish green in the older leaves, maroon in the young foliage. The petioles and young branchlets are

also maroon-colored. The flowers are borne in few-flowered umbels, arranged in small, axillary, paniculate clusters, which are set closely together (a panicle to every leaf) along the previous year's growth of the branchlets. Owing to the arrangement of the drooping branchlets, it often happens that the blossoms on a number of them are crowded together in a dense mass a foot or two in diameter, like a large swarm of bees. The individual flowers are about three-quarters of an inch across, in color creamy white. The seed-pods are about half an inch in length, truncate-ovate, with slightly flaring mouth, so as to be almost wen-shaped. The smooth bark, deciduous in thin flakes, is beautifully colored in delicate tints, varying from pale gray-green to lavender. Occasionally under the summer sun one of these tapering shafts warms up from its cool grays to a clear flesh-tint. Australian reports ascribe considerable utility to the timber of *E. citriodora*, and ornamentally this tree certainly ranks high, its general appearance at once suggesting the words graceful and elegant. Its flowers are borne profusely in May, June and July, at which time the tree is much frequented by bees. The leaves yield a volatile oil exquisitely lemon-scented. This perfume is not perceptible in the fresh leaves unless they are bruised, but it is gradually exhaled by drying leaves, which remain aromatic long after they are quite dry. Even the ashes of burned leaves retain the perfume. The best specimen of this tree in the arboretum here measures about fifty feet in height, with a spread of eighteen feet, and a girth of twenty-eight inches at one foot from the ground. This is the growth of nine years from planting, ten years from the seed, without irrigation.

Eucalyptus cornuta, the "Yate" tree of south-western Australia, is a tree of fairly rapid growth here, and of somewhat variable habit. It often displays strong tendency to divide at or near the ground, forming several stems unless trimmed. It has lanceolate leaves, slightly falcate, acuminate, five to seven inches long by one to one and a half inches broad at the widest part, dark green on both sides, shining, with a metallic lustre in sunshine. The flowers have very short pedicels, so that the many-flowered umbellate cluster is almost a globular head. In bud the long, slender, cylindrical, curved calyx lids or caps project on all sides like radiating horns, whence the specific name *Cornuta*. When these caps fall the long stamens spread, forming a pompon of a bright greenish yellow color. Often the blossoms are borne in large masses, and the effect is brilliant. The long, slender, projecting valves of the bell-shaped seed-pods continue the horned appearance to the fruit cluster. The wood of this species is highly valued in its native habitat, being there considered equal to the best ash. The flowers, like those of many other *Eucalypti*, yield a quantity of nectar, which is eagerly sought by bees, who visit the flowers even before the caps have fallen, and doubtless often help to push them off. The principal blooming season is in July and August, with a secondary season following about midwinter.

Eucalyptus cornuta, var. *Lehmannii*, as grown here, differs a good deal from the type. It displays the same tendency to divide into several stems, but is a much slower-growing tree with a symmetrically spreading crown of more open and scattered foliage. The leaves are oblong to narrowly obovate, mucronate, two to three inches long by about one inch wide, dull green on both sides, coriaceous, with petioles shorter than those of the type. The individual flowers are sessile, and the calyces united at the base, so that the umbel becomes in this variety a dense head. The horn-like calyx lids are longer, thicker, and often more curved than those of *E. cornuta*. The pompon is correspondingly larger and of a clear apple-green color. The seed-pods coalesce for almost their entire length, forming a spiny ball which remotely suggests a diminutive hedgehog. As with the type, the curious fruit clusters are long persistent on the tree, where they attract no little attention from visitors to the station.

Eucalyptus tetraptera is a dwarf species with curious

characteristics. The leaves are borne in tufts on the ends of the few branches, the old leaves dropping off as the branches elongate. They are ovate-lanceolate in shape, mucronate, very thick and coriaceous in texture, and dull-grass-green in color on both sides. They develop slowly, but when of full size are about eight inches long by two inches broad, with a mucronate point three-eighths of an inch in length. The midrib and petiole are thick and yellowish green in color, like the branchlets. Only one or two flowers appear at a time, and, like the leaves, they are very slow in developing. The fleshy calyx tube, prominently four-angled, green in the bud, flushes a brilliant red as the flower approaches maturity. Finally the pyramidal cap falls, displaying the incurved stamens with their delicately pink filaments tipped by purplish gray anthers. The seed-pods, when full grown, measure two inches in length by one and a half inches in breadth to outside edge of wings. They are quadrangular bell-shaped, with a pronounced wing at each angle, and are supported by a thick, flattened peduncle, bent downward. The brilliant red of the young fruit fades as the pod shrivels. So far the single specimen here has matured no seed. The bark is dull maroon in color and is deciduous in small flakes. The species probably has no value beyond its botanical peculiarities.

Santa Monica, Calif.

John H. Barber.

New or Little-known Plants.

Coriaria Japonica.

THIS handsome and interesting plant, the representative of a genus monotypic in its family, and composed of six or seven species, natives of the Mediterranean Basin, the Himalayas, northern China, Japan, New Zealand, Chili and Peru, promises to become an inhabitant of our gardens, as it has proved hardy in the Arnold Arboretum, where it was raised in 1893 from seeds gathered by Mr. Veitch the year before near Fukura, on the west coast of the central island of Japan, and where this year it has produced the flowers and fruit which appear in our illustration on page 343 of this issue.

*Coriaria Japonica** is a square-stemmed shrub which is said to grow to the height of ten feet. In the Arboretum, however, the arching stems are not more than two and a half feet long, and plants which I saw in the garden of the Forest School near Tōkyō were about the same size. I never encountered wild plants in Japan and they were seen by my companion, Mr. Veitch, only on the excursion which he made to the west coast.

The value of *Coriaria Japonica* as an ornamental plant is in the long racemose fruit, the showy part consisting of the accrescent petals of the pistillate flowers, which, becoming much thickened and succulent, enclose the five nutlets and form a five-angled, much-flattened, berry-like fruit half an inch in diameter. In describing this plant last year in *The Botanical Magazine* (t. 7509), Sir Joseph Hooker spoke of the cherry or coral-red color of the fruiting petals as its most interesting feature, the mature petals of all the other species being black or violet-black, his statement being enforced by the figure in a Japanese work on the useful plants of that country, in which the fruit is represented as bright red and described as "round, red, very pretty, but poisonous." Maximowicz, who has written a classical monograph of the genus *Coriaria*, described the fruit as black, with violet juice, and this character is confirmed by the plants in the Arboretum, on which the fruit was bright coral-red on the 20th of July, when it was from a quarter to a third of an inch in diameter, being then in the condition in which it appears in the figure of *The Botanical Magazine*; it then began to enlarge rapidly, and in a few days attained its full size, turning suddenly dark violet-black, the petals becoming filled with juice which dyes purple.

* *Coriaria Japonica*, Gray, *Mém. Am. Acad.*, n. ser., vi., 383 (*On the Botany of Japan*) (1859).—Miquel, *Ann. Mus. Bot. Lugd. Bat.*, iii., 91 (*Prod. Fl. Jap.*, 255).—Franchet & Savatier, *Enum. Pl. Jap.*, i., 93.—Maximowicz, *Mém. Acad. Sci. St. Pétersbourg*, sér. 7, xxix., No. 3, 9, t.—*Bot. Mag.*, cxxii., t. 7509.



Fig. 45.—*Coriaria Japonica*.—See page 342.

1. A flowering branch, natural size. 2. A fruiting branch, natural size. 3. A staminate flower, enlarged. 4. A pistillate flower, enlarged. 5. A pistil, enlarged. 6. Vertical section of a fruit, enlarged. 7. A nutlet, enlarged.

The bark of the old stems of *Coriaria Japonica* is dark orange-color, lustrous and marked by numerous lenticels, while on the upper side of the shoots of the season, which are produced from the axils of the leaves of the previous year, it is rather bright red and yellow-green on the lower side. The leaves are opposite, ovate or ovate-lanceolate, acuminate, conspicuously three-nerved, yellow-green, and from three to six inches in length. The flowers, which are minute, are produced in elongated spreading racemes with the branches of the year from the leaf-scars of leaves of the previous year in clusters of two or three, either all female, or with one raceme of male flowers among them, and clothed with ovate or nearly orbicular leafy bracts, the racemes bearing male flowers being more slender than the others. The staminate flowers, which are borne on short pedicels, are green, and are composed of five minute ovate acute sepals much longer than the oblong-keeled petals, and of ten stamens in two series, with slender filaments which, short at first, lengthen rapidly after the flowers open, becoming much exserted, and linear-oblong introrse anthers inserted on the back. The pistillate flowers are borne on slender pedicels which are about a third of an inch long when the fruit ripens, and are subglobose, green, with five ovate sepals much longer than the broadly ovate imbricated petals rounded at the apex, five exserted slender purple spreading styles slightly thickened toward the apex, a pistil of five carpels each with a single anatropous ovule, which develop into five pale brown subreniform nutlets about an eighth of an inch in length, marked on the sides with five prominent anastomosing ribs. C. S. S.

Foreign Correspondence.

London Letter.

LONDON PARKS AND CAFÉS.—A movement has been started, headed by several influential people, to establish in the principal public parks of the metropolis, cafés of similar character to those of the parks of Paris and other Continental towns. Presumably the London crowds cannot find sufficient enjoyment in the trees, flowers and lawns of our parks and public gardens, and even the bands which now play on every day during the summer in most of them do not contribute all that is needed to make such places thoroughly attractive. I am inclined to believe that the crowds do find plenty of healthy recreation in our parks as they are, and that it is only the man of pleasure who now wants to add the flaunting café or biere-hal. Of course, the parks are for the people, and properly conducted refreshment halls are not out of keeping with their object, but whether the midnight revels of the Bois de Boulogne would be an improvement to Hyde or Regents' Park is a question of considerable doubt for Englishmen, at any rate.

EARLIER OPENING OF KEW.—From time to time, and more or less concurrently with the "big gooseberry stories," an agitation is started in favor of the earlier opening to the public of the Royal Gardens, Kew. The movement is purely local, and has for its main object the gratification of the leisured people residing near the gardens. The public are at present admitted from 12 o'clock, noon, till sunset, except on Sundays, when the opening hour is 1 o'clock, and on bank holidays, when it is 10 o'clock. Before these hours, with the exception of Sunday mornings, the gardens are open only to students, artists and visitors from a long distance, while to gardeners generally they are always accessible. It is difficult to satisfy these agitators, who look upon Kew merely as a pleasant sort of park where one can smoke or read comfortably under the shade of trees, that the principal object for which the gardens were founded, and are still supported, is the development of botanical science and the application of its resources to the enrichment of the empire, and that any further concession to the pleasure-seeker than those already made could only be at the expense of this object. If Kew is to be placed on

a level with Hampstead Heath or Epping Forest the time of its staff will be wholly employed in looking after irresponsible visitors.

THE FRUIT CROP IN ENGLAND.—With the exception of a few favored districts, the prospects of fruit-growers this year are bad. All the plums have fared very badly, some counties—Cambridge, for instance, which depends largely upon Green Gages, having scarcely any. Apples and pears are generally very weak. Cherries have not been so poor for years. Altogether, the outlook for the English fruit farmer this year is a melancholy one. We shall probably learn from the county council lecturer that failure is due to our bad methods of cultivation. Mr. R. D. Blackmore, writing after forty years' experience in fruit-culture, attributes this year's bad crop to the long summer drought experienced last year, followed by a wet September, which caused the trees to rush into a late second growth at the expense of the bloom-bud, which, though formed, was weak, and, consequently, when the flowers opened they succumbed to the first chill. Probably an excess of imported fruit will make up the deficiency, though what fruit we have now is at almost famine prices.

CANNAS AND GLADIOLI.—A novel and highly decorative use of the small-flowered forms of *Canna* with *Gladiolus gandavensis* is practised by the Parisian market-growers. The Cannas are planted in the usual manner in six or eight inch pots, and along with each one, two or three corms of the *Gladiolus* are placed; these grow with the Cannas and when in flower they combine admirably with their leaves, having a much better effect than even the best varieties of *Canna*, while their cost is only about a franc per pot. For the decoration of halls, cafés, restaurants, etc., they find much favor with the Parisians, and to the uninitiated the flowers of the *Gladiolus* serve just as well, probably better than the best of Cannas. It may be that the "trick" is well known to American market-growers, but I have never seen examples of it in England. It is certainly a cheap and easy method of producing serviceable material for ordinary decoration. A bed of common Cannas and this *Gladiolus*, or even mixed varieties, would be effective in the flower garden.

HEMEROCALLIS AURANTIACA AND ITS VARIETY MAJOR.—The variety has become universally popular with growers of herbaceous plants, its handsome bright green leaves in bold tufts and its enormous orange-yellow flowers placing it in the first rank among hardy plants for prominent positions in the border or flower garden. Some who have essayed its cultivation have expressed themselves disappointed with it, but this is no doubt because the plants are small and weak consequent upon rapid and exhaustive propagation. When full-grown in strong, loamy soil it is by far the handsomest of the genus. The type has remained comparatively unknown; indeed, some one lately ventured to doubt its existence, in cultivation at any rate. It was, however, first described by Mr. Baker in *The Gardeners' Chronicle* in 1890 from a plant in the Kew collection, where it still flourishes and has flowered freely this year. The variety is of Japanese origin and was introduced four years ago by Messrs. Wallace, of Colchester.

CALCEOLARIA ALBA.—A first-class certificate was awarded to this plant recently by the Royal Horticultural Society, Mr. Bennett-Poë showing some beautifully grown examples of it in pots. It was first brought into notice at Kew last year, where it flowered profusely on a south wall all through the summer, after having survived several winters without protection. On the strength of this the plant was supposed to be hardy, but last winter, although comparatively a mild one, proved fatal to all the plants left in the open at Kew. It is a native of Chili, and, therefore, likely to be happiest under cold greenhouse treatment, except in warm situations, such, for instance, as are suitable for the Chilean *Desfontainea*. It forms a dense shrub not unlike the common lavender, but softer in leaf and stem, and the flowers, which are borne in the greatest profusion in axillary clusters, are globular and pure white, resembling in effect the

fruits of the Snowberry, *Symphoricarpos*. Both seeds and plants of it are now to be had from the nurserymen.

ERIOPSIS HELENÆ.—This is a new species, according to Dr. Kranzlin, who describes it as the largest flowered yet found in the genus, resembling at first sight *E. biloba*, but more than twice as large. The pseudo bulbs are sixteen inches long, with one long and three short internodes, and the leaves twenty inches long by one inch in width; the scape is as long as the leaves, and bears a nodding raceme of yellow flowers with purple margins, and the lip is densely spotted with the same color. It has been imported from Peru by Messrs. F. Sander & Co., St. Albans, with whom it has lately flowered. The genus is not one of the most popular with English cultivators, the species hitherto grown being shy of flowering. Possibly this new species may prove more satisfactory. Dr. Kranzlin says "it is undoubtedly the finest species of this small genus."

BRITISH FERNS.—The numerous varieties, many of them very beautiful, of British Ferns now in cultivation, and for the origin of which we are indebted to the careful cultivation, selection and, it is said, cross-breeding of a few enthusiasts, have increased in favor, especially among amateurs. We have now a society devoted to them, calling itself the British Pteridological, and having for its objects the dissemination of a wider knowledge of the merits and beauties of British Ferns and their varieties, a regulation of their nomenclature, the encouragement of their general culture by providing a means, at least once a year, for an exhibition of them and the meeting of their finders and raisers under one roof for the exchange of cultural knowledge and specimens. Mr. E. J. Lowe, F. R. S., has raised some most extraordinary varieties, especially among *Scolopendriums*, and he has written several interesting volumes upon the peculiarities of growth and variation among ferns generally under artificial cultivation. The president of the society is Dr. Stansfield.

London.

W. Watson.

Cultural Department.

Gooseberries.

WHILE this season has not been altogether favorable to some fruits it has suited Gooseberries to a nicety. The cool, showery weather in May and June swelled out the fruits to more than double the size to which we usually grow them, and the bushes bore such an enormous crop that they were severely thinned when about half-grown, this green fruit proving acceptable for sauce and pies. We have only found one or two varieties to be thoroughly reliable. Of the foreign or English sorts, Whinham's Industry is easily the best we have tried; some sorts bear larger berries, but for heavy annual crops, free growth and a total absence of mildew we considered Industry the best foreign variety. From bushes planted in the fall of 1894 we gathered an average of twelve quarts of ripe fruit from each plant, besides the green fruit picked early in the season and that which burst during the wet weather. We find this variety succeeds best when not planted in a fully exposed place, but where the plants get sunshine about half the day. Full sunshine during all of the day causes some of the berries which are most exposed to be scorched and to drop off.

Among American varieties we think highly of Columbus, sent out by Ellwanger & Barry, of Rochester, New York, four or five years ago. The fruit is much larger with us than that of Industry; skin greenish yellow and smooth, and the foliage is large and smooth. It is a heavy cropper and the most robust grower of any sort we have tested. Triumph is a large golden-yellow variety of size similar to Columbus, and is an equally robust grower and great cropper. Both these varieties have very thick skins, and thick skins seem to be an essential quality of any gooseberry which is of use in America, as thin-skinned sorts are literally cooked on the bushes by scorching heat from the sun in July. Downing is an old reliable sort, much smaller than Triumph and Columbus, but a reliable cropper, and the fruit ripens some days earlier than that of any other kinds we have tried.

Gooseberries prefer a cool and rather moist climate. We always mulch our bushes after growth commences and leave

this surface-dressing on until fall, when it is removed. The bushes are then pruned and a coating of good rotten manure is given them. Like all small fruits, Gooseberries have large quantities of fine fibrous roots near the surface of the soil and no digging should be done among them. Stirring with a hoe to keep down weeds and to loosen the surface is all the cultivation needed. During the growing season we give our bushes several soakings of liquid-manure after heavy rainfalls, and this labor is fully repaid by increased size of the fruit.

Gooseberries can be propagated in a variety of ways, but cuttings make the most shapely bushes. The strongest and best ripened shoots should be selected. We prefer cuttings about a foot long after the top has been shortened back. We rub off all lower eyes and leave only four to five at the top of each cutting. If it is not desired to plant them out in the fall they can be heeled into a cold frame; they should be tramped firmly and never allowed to become dry. By April 1st they will be found to have callus formed and can be planted out in any good garden soil, and a moist location should have the preference. In dry weather water must be given or few of the cuttings will grow. Propagation by layers and suckers will give larger bushes in a short time, but the bushes are never shapely and constantly send up suckers from the base. We prefer fall planting for Gooseberries, and, indeed, for nearly all other fruits, and move them as soon as they shed their foliage.

Taunton, Mass.

W. N. Craig.

Fern Notes.

FEW Ferns require repotting at this season, except seedlings or young stock that is much root-bound and may be needed for use in Fern-pans, or for table or mantel decorations during the winter. Young plants of the common species used for these purposes, for example, *Adiantum cuneatum*, varieties of *Pteris*, *Anychia japonicum*, *Davallia tenuifolia* stricta and several of the *Aspidiums*, may be potted on at any season of the year when grown in a temperature of sixty degrees, and will grow away freely, while old plants of the same species grow but little during the fall and winter months, and may receive a severe check from having their roots disturbed too late in the season.

Watering should be done early in the morning at this season, as the night air is damp, and plants watered late in the day have no chance to dry off, so that damping of the foliage follows. Abundant ventilation, both day and night, is essential, and even tropical species require plenty of fresh air. For many species of Ferns the soil is of much less moment than the condition of the atmosphere, though good drainage is necessary for the health of the roots. For the ordinary decorative species referred to, a good soil is a light loam enriched with some thoroughly rotted manure from an old hot-bed.

The sowing of Fern-spores of any delicate species after this time of year is ill-advised, as there is greater risk of the tender young plants damping off during the shorter days of early winter than in the spring. Their growth is at best quite slow in winter, and but little time is gained by fall sowing. As an instance of the facility with which Fern-spores may be carried from place to place I recall a greenhouse which had contained no Ferns, and where no less than twenty-six species and varieties were growing beneath the benches within eighteen months from the time of building the house. The nearest Fern-house to the house in question was fully one hundred feet distant, and the spores were doubtless transferred in the clothing of persons who passed from one house to the other.

Of course, all Ferns cannot be grown with equal success in the same house, for many cool-house Ferns are unresponsive in a high temperature, and others from a tropical habitat do not flourish when kept too cool. The medium temperature of fifty to fifty-five degrees, maintained throughout the winter, will make it possible to grow with satisfaction quite a large and varied collection of these plants, and a house of this character well cared for will prove one of the most enjoyable in an establishment.

The so-called Boston Fern, a form of *Nephrolepis exaltata*, has become a great favorite for the window garden as well as the greenhouse during the past two or three seasons, and deserves the distinction. It is a plant of easy culture and rapid growth, and makes an interesting specimen in a pot six inches or more in size. In common with the other Sword Ferns, this *Nephrolepis* enjoys good living, and grows finely in strong loam. When pot-bound it is benefited by watering with weak liquid manure about once a week. *N. cordata compacta* and *N. davallioides furcans* are also largely grown for decorative purposes; the first-named is probably the better house plant,

and makes a good specimen even in a four-inch pot. While curiosities or monstrosities such as the birds, beasts and reptiles formed by the Japanese from the rhizomes of *Davallia Mariesii* cannot be recommended, grown in a more natural manner this species is useful for the cool fernery, though nearly or quite deciduous. In fact, the *Davallias* generally are interesting, and *D. bullata*, *D. Canariensis*, *D. pentaphylla*, *D. tenuifolia stricta* and *D. elegans* may all be grown to advantage in a temperate house, either as pot-plants or in baskets. The latter method gives a better opportunity to dispose of the straggling rhizomes by pegging down than in the case of those grown in pots.

Holmesburg, Pa.

W. H. Taplin.

Gloxinias.

SEEDS of *Gloxinias* are usually sown during autumn, though sowing in spring is becoming more common. One of the chief advantages of autumn sowing is that all the plants come into bloom when a suitably low temperature can be maintained. The flowers are susceptible to flagging, and the blooming period is considerably shortened when it occurs during the hot, drying summer months. It is also somewhat difficult to prevent the plants from becoming drawn if a heavy shading has to be used. The plants are not so apt to suffer from flagging influences so long as sufficient water is provided, but if neglected in this respect disfigurement of the foliage will quickly follow.

February is a favorable time for sowing the seed, and the temperature of an ordinary propagating house is sufficiently high for starting them. The seed-pans intended for use must be thoroughly clean and dry, so as to insure against any germs of fungus. If this precaution is not taken the fungus will soon make its appearance on the surface of the soil and cut off the little plants shortly after they have started. Much of what is commonly known as damping can be traced to this source, though this is by no means the only source from which it proceeds, and careless watering will often cause it. We do not water on the surface, but supply the moisture from below by keeping the pan standing in a saucer of water. The dangers of damping may be considerably lessened by pricking out the seedlings into fresh soil while they are as small as they can possibly be handled. A good compost for the seeds is composed of finely sifted leaf-mold and silver sand in about equal portions. The same compost may be used for the first pricking out, but for subsequent shiftings less sand will be needed, and for the later pottings well-rotted sod soil should be used with about one-third of the compost. We sift this soil also, as the roots are rather fine.

After the plants are established in three-inch pots we place them in a cold frame, where they grow more freely than in any other place in which we have tried them. Removable shades must, of course, be provided, and light sprinkling twice daily during bright sunshiny days, to maintain a suitable atmosphere. We usually leave the plants in frames until flowering commences, when they are removed in batches to a house where they can be displayed to the best advantage. We choose the coolest house possible for them and provide suitable shading. The poorer varieties are discarded or set aside as soon as they show their character, to prevent good varieties being crossed by them. We save seeds from our own plants, and this is by no means a troublesome matter, as they are produced freely if the flowers are kept dry.

Tarrytown, N. Y.

William Scott.

Hardy Perennials.

NOT a few of the perennial species of *Coreopsis* are quite hardy, and as they flower very freely during a long season they are specially suited for use as border plants. Probably the best-known species in gardens is *C. lanceolata*; it is altogether hardy and thrives in any good soil, and the flowers continue from early summer until frost. Full-grown plants range from one to two feet in height. The flower-heads are of a shining yellow color, and on well-grown plants measure from two to three inches across. They are produced on long, naked pedicels which add much to the effectiveness of the plants, and are useful for cutting. This *Coreopsis* produces an abundance of seeds, and young plants are easily raised from them. Sown early in spring the young plants may be set out into the ground in the early summer and will provide a good supply of flowers in the fall.

Another satisfactory species for the garden, though but seldom seen, is *Coreopsis delphinifolia*. This distinct southern species is quite hardy without protection in this vicinity, and grows luxuriantly. The plants reach a height of two feet, and its upright stems are thickly clothed with deep green leaves

divided into three sessile leaflets. The yellow flower-heads are not quite as large as those of some of the other perennial kinds, but they are produced plentifully. In a rich sandy soil, where there is abundance of light, this plant makes a good border perennial.

Coreopsis verticellata has slender upright stems and finely cut foliage, with a neat bushy habit. Its height varies from eighteen inches to two feet, and the stems are set off by dark green and finely cut leaves, which are produced in whorls. The deep yellow flower-heads measure about one inch and a half across and are most plentiful during late summer and early fall. *C. senifolia*, found from North Carolina to Florida, is quite hardy here. The stout, vigorous plants grow to be three feet tall and bear good-sized leaves, which are divided into three entire sessile divisions. The dull yellow flowers are of medium size.

Coreopsis grandiflora is the best of the perennial species, and where it will grow and thrive it is one of the showiest of the low-growing compositæ for the border. I regret that it does not thrive here as well as many of the other species. It does not live and has to be grown from seed frequently. I notice that Dr. Asa Gray, in the *Synoptical Flora of North America*, says that the root is sometimes annual, and this is possibly the reason for its short existence. It resembles *C. lanceolata* in many of its parts, but the main distinction for garden purposes is that its flowers are much larger and the ray florets are more deeply cut. Other species grown here that are quite hardy and reliable are *C. auriculata*, *C. pubescens*, *C. tripteris* and *C. rosea*.

The wild Monkshood, *Aconitum uncinatum*, when planted in a favorable position, makes a splendid mass of dark blue. It is the best plant bearing blue flowers at this time. A slightly shaded spot and rather rich, moist soil here suit it best. The stems of this Monkshood are not very stout, and need staking to keep them erect, so that the flowers can be seen to better advantage. Our plants are from four to five feet high, well covered with dark green leaves, and the dark blue flowers are produced in large showy racemes.

Statice latifolia is again lending its grace and airiness to the border with its broad, spreading panicles of blue flowers. This is the best hardy perennial species in the genus. Large plants make a striking contrast and pleasing effect among more substantial-looking plants. A deep, rich, somewhat moist soil is necessary, and the plants should not be disturbed often. Another species well worth growing is *S. elata*. Though hardly as pleasing as *S. latifolia*, it is, nevertheless, a desirable border plant. It is slightly taller and not as graceful or airy, but it has large showy panicles of small blue flowers, and makes a vigorous plant. Besides the use of these delicate sprays for intermixing with other flowers, they are also sometimes dried like the "Everlastings."

Rudbeckia speciosa makes a rich display in the border when large clumps are planted from six to eight yards apart, and the glowing masses of bloom are showy at a considerable distance. The flower-heads of this Cone-flower are a rich orange-yellow with a showy velvety maroon centre, and measure from three to four inches in diameter. They are borne profusely in dense masses. The compact plants are about two feet in height and thickly covered with ovate lanceolate leaves. It thrives best in an open position in light rich soil.

Veronica longifolia, var. *subsessilis*, deserves to be classed among choice garden perennials. Like many more of our showy garden plants, it comes from Japan, and is perfectly hardy here. When well grown it attains a height of from three to four feet and its stems are terminated with large dense spikes of deep purple-blue flowers, which make it effective. *V. virginica* is a tall-growing species and a native plant. Well-established plants are conspicuous at this time with their large terminal spikes of white flowers.

Harvard Botanic Garden, Cambridge, Mass.

Robert Cameron.

Rock Garden Notes.

ONE of the handsomest plants on the rockery now is the Mexican *Hunnemannia fumariæfolia*. The large yellow flowers are not unlike the Californian Poppy, but have more substance, and the flowers last several days after being cut. The plants are not entirely hardy here, though they come through some winters in good condition, and some half-decayed leaves thrown over the roots help them to winter over. If seed is started in the fall it should have the benefit of a warm house; spring-sown seeds delay the flowering period until the beginning of July.

Owing, I suppose, to the moist season, the varieties of *Achimenes* have done exceptionally well this summer. Care

is taken to plant them in somewhat shaded situations, otherwise they neither grow nor flower quite so freely. The plants make such a host of underground tubercles that it is only necessary to lift a few of them in the fall by inserting a trowel under the middle portion of the plant, and transfer them with the soil to a box. The kinds should be kept separate, and the boxes stand in a moderately warm dry place during winter.

Papaver rupifragum is almost past its second blooming since the plants were put out in the spring. The seed capsules were cut off after the first flowering, the stems cut rather close, and they soon branched out again, producing hundreds of rather small flowers on each plant. The flowers are dull red, the leaves grayish green. *Salvia Pitcheri* is only coming into flower. This lovely species needs renewing every now and then to have it at its best.

Potentilla fruticosa, the native shrubby Cinque-foil, now in full flower, makes a desirable shrub for use among rocks. It can be trimmed to any shape or cut down annually if need be. *Spiræa Anthony Waterer*, after two years' trial, has fulfilled all the claims made for it. Since early spring it has never been out of bloom, and the bushes are not a foot high yet. Plants started into growth indoors early in the season will give a cutting from nearly every bud. They are as easy to root as *Coleus*.

Hydrolea spinosa being a blue flower and a very pretty one should have a place in every large garden. It is apt to run to seed in a short time if it is not watched. If planted in clumps it is well to nip off half the shoots when they get to a certain height and let the other half bloom. By the time the first lot are done flowering the others will take their places, when those which flowered first should be divested of their seed vessels. These shoots will bloom again later on.

Anoda acerifolia, a malvaceous plant from Mexico, is evidently closely allied to *Callirhoe*. The flowers are about the same size and color as those of the well-known *C. involucrata*. Instead of a few straggling stems, as is the case with the *Callirhoe*, the *Anoda* will cover several square feet with a dense mass of creeping shoots. It is just coming into bloom now, and until checked by cold weather it will be an attractive object. It is not hardy with us, but it ripens seeds in abundance.

Lilium lancifolium roseum and *L. album* are among the most satisfactory of the genus with us, coming up regularly every year and producing six and eight blooms to the stalk. A top-dressing of manure each fall seems to suit them. *L. Michauxii* does fairly well, and *L. auratum* succeeds only the first year after planting, dwindling each season afterwards until it dies.

Plumbago Larpentæ, or as it is now called, *Ceratostigma plumbaginoides*, is, perhaps, the prettiest of our blue-flowered hardy perennials. It is well adapted for rock-work, as it grows only a few inches high, and in favorable situations it blooms from midsummer until frost. This species was grown as a stove plant for a long time after its introduction. Although perfectly hardy it does best in countries having a high summer temperature.

Clitoria ternatea has flowers quite as large as the native *C. Mariana*; the color is blue or white. It is best treated as an annual, and if sown early it will cover an astonishing amount of space.

Botanic Garden, Washington, D. C.

G. W. Oliver.

Correspondence.

The Green Scale of Coffee.

To the Editor of GARDEN AND FOREST:

Sir,—It seems desirable to record the fact that the green Coffee scale of Ceylon, so destructive in that country, has been found on Coffee in Sao Paulo, Brazil, by Dr. von Ihering. The specimens, just received from the S. Paulo Museum, agree excellently with others sent from Ceylon by Mr. E. E. Green. The insect is a species of *Lecanium* (*L. viride*, Green) very similar to our common *L. hesperidum*, but considerably smaller, and of a green color.

Mesilla, N. M.

T. D. A. Cockerell.

Hardiness of the Montbretias.

To the Editor of GARDEN AND FOREST:

Sir,—I read with interest in your issue for August 18th the note on *Crocsmia aurea imperialis* by Mr. Gerard, whose articles I have greatly enjoyed and profited by. Mr. Gerard states that "the Montbretias only have been tried here, but

have never survived in the open." In New Hampshire we have a severe climate, occasionally twenty degrees below zero, and no protecting snow, perhaps, at the time, and the ground freezes to the depth of from two and a half to four feet. Two years ago this fall I set in the open a lot of *Montbretia crocosmia flora*, and gave them a covering of leaves only. They have passed through two severe winters, have greatly increased in numbers, and to-day are in full bloom. Again, the year before I caused to be planted in a cemetery in which I am interested a lot of *M. Pottsii*, giving them the same treatment, and with about the same results, though a few never came to the surface. Mr. J. Woodward Manning, of Reading, Massachusetts, when visiting the cemetery with me spoke of *M. Pottsii* as being very tender, and was surprised to see it thriving here grown in this way. The soil in each case is a sandy loam with good drainage, with full exposure and no protecting trees or fences. This winter I propose trying a few plants wholly unprotected, to test the results of this treatment.

Nashua, N. H.

C. W. Hoitt.

Japan Plums.

To the Editor of GARDEN AND FOREST:

Sir,—This new race of garden Plums has been regarded with much interest recently, principally, perhaps, because of the claim made that the Japan Plums do not become a prey to the black-knot fungus that has made it practically impossible of late years to grow the older race of garden Plums.

We have an almost complete set of these Plums under trial so far as they are now in commerce, and this year have been able to judge what the fruit is like. *Prunus Simoni* is the progenitor of this race, and while that species is a rather poor fruit it is very distinct, both in shape, flavor and habit of growth. There is an unpleasant astringency in the skin of the fruit that affects preserves even, and it is necessary to peel the fruit to avoid this unpleasant flavor. But the value of *P. Simoni* is as a fruit for hybridists to work with.

The best Japan Plum we have found thus far is the Burbank, so named after its raiser, and which seems to be a cross between *Prunus Simoni* and one of our native Plums. There is certainly no finer plum in cultivation to-day if we take into consideration its hardiness, free growth and the large size and excellent flavor of its fruit. The tree was in full bloom this spring when a severe frost occurred that ruined most other trees in bloom, but the Burbank Plum came through well and did not seem hurt in the least. The growth made in the first two years after planting was phenomenal, about six feet all over the tree, and no signs of winter-killing were visible. The fruit is as large as a moderate-sized peach, with yellow flesh and a very small stone. We have decided to graft all the older kinds of Plum with the Burbank next spring. This will have the effect of modifying the growth somewhat, and may eventually be an unequal union of stock and scion. This resulted when *P. Simoni* was worked on the common sorts that had been subject to black-knot, but otherwise the effect was good.

Another Plum we have fruited to a limited extent this year is the Kelsey. It is a much smaller fruit than the Burbank, greenish yellow in color, somewhat like the Green Gage, but not so good in flavor, and it is not a very vigorous grower. It will need another year's trial before we can tell of its value with certainty.

The Abundance Plum is said to excel the Burbank in all respects. I shall be surprised to find this a fact, and it does not now seem impossible. It is highly recommended for planting for market, and a great many of the trees have been set out in this district. We have not fruited it yet, but hope to next year. Among others that are on trial are the Wickson and Satsuma, of Japanese origin. All have proved hardy, free from disease and not subject to any insect attacks. The only objection to be brought against them is their spreading habit, but if this characteristic had been known earlier it could have been corrected by pruning. The knife should be used freely on young trees to bring them into shape and keep them compact, so as to prevent breakage to the trees hereafter by heavy crops of fruit.

To those who wish to grow Plums in the garden I advise the trying of a set of these Japan Plums, as there seems to be good reason to believe that they will be the Plums of the future when the black-knot has wiped the older race out of existence. This pest is hard to control when the hedgerows are full of native species of *Prunus*, and these trees serve for its propagation. Fruit growers have considered it hopeless to be able to fight the fungus, and are planting the Japanese Plums in place of the native kinds. In planting it should be borne in mind that a much greater distance is needed between the trees

than between other Plums—at least eighteen feet when mature growth is reached by the trees. The curculio seems to be quite as troublesome in these new Plums as on the older ones, though we had hoped much from the thicker-skinned fruit. But to have clear-skinned plums the curculio must be fought in early summer, when it is doing its work. We lost but few from the stings, but the fruit was disfigured.

South Lancaster, Mass.

E. O. Orpet.

Notes.

The annual meeting of the West Virginia Horticultural Society, Sheep-breeders and Wool-growers' Association, together with the State Board of Agriculture, will be held at Martinsburg, West Virginia, from October 12th to 15th.

The best cucumbers in market now are those grown under glass near Morganville, New Jersey, the heavy rains of the past weeks having injured the field crops of this vegetable. Choice cauliflower, from western New York, costs thirty cents a head. Small yellow tomatoes, for preserving, and immense yellow cucumbers, known in the trade as mustard pickles, are early fall offerings, and new Brussels sprouts from Long Island.

The sales of western fruits this summer have been exceptionally large here, and those of last week surpassed all former records. Altogether, 123 carloads from California, Oregon, Washington and Utah were sold. Grapes, peaches, plums and Bartlett pears comprised the bulk of these shipments, which included the first Zoe, Forelle and Comice pears of this season, with considerable quantities of Seckel and Buerre Clairgeau pears. Two carloads of Late Valencia oranges were a remarkable item in the long list of California fruits.

The California correspondent of the New York *Tribune*, in a dispatch to that journal a few days ago, stated that the Big Star Beet-sugar mill which will start up next January near Martinez will not only make sugar from beets, but will refine cane-sugar from Hawaiian plantations that are not controlled by the present monopoly. It is estimated that this year's crop, which is outside the influence of the trust, amounts to 200,000 tons, of which a large fraction will come to this factory. Stockton is also to have a beet-sugar factory, the plant of which will cost over \$500,000. Its capacity will be 500 tons. The soil of the rich San Joaquin Valley is specially adapted to sugar-beets, and tests have shown that the saccharine percentage is very large.

Plants sometimes acquire a reputation for being difficult subjects to grow or flower when they may only require some slightly special treatment or even a particular location. *Cattleya Dowiana* has a reputation for miffiness, but Mr. Gerard, who recently sent some of its handsome flowers to this office, states that it has bloomed regularly in August in his greenhouse with no special care, except that it is grown in a basket, and is retained as far as possible in the same situation, a place where it finds much pure air and a moderate amount of light. This *Cattleya* is one of the most distinctly colored of the family, and is a pleasing change from the ordinary purple kinds. The very large flowers have petals and sepals of nankeen-yellow, and the large lip is a rich dark crimson, finely veined with gold. The petals and lip are both beautifully fringed.

The local receipts of apples for last week amounted to 11,342 barrels. Duchess of Oldenburg, Gravenstein, Maiden's Blush, Codling, Pound Sweets, Orange, Holland and Twenty-ounce Pippins were the principal sorts, with some specially large and showy Alexanders. The best peaches now come from western Maryland and from Missouri and Arkansas, although the main dependence is, of course, on the large supplies of more ordinary quality from Maryland and Delaware. Concord, Niagara, Delaware, Wyoming, Worden, Moore's Early and Champion grapes are all now in season and come from the interior of this state; three-pound baskets sell for fifteen to forty cents, according to the variety and quality. Hot-house grapes, nectarines and figs, apricots from Arizona, and large alligator pears are among the special offerings in choice collections of fruit.

Watermelons continue plentiful, and in this city an ordinary day's business last week comprised twenty-one carloads and 43,086 melons by steamer, besides wagonloads from near-by farms. Jenny Lind and other varieties of muskmelons are coming in large quantities from Maryland, Virginia and New Jersey. Among the most notable offerings of fruits now seen are some Montreal muskmelons. These are not only of immense size, but superior flavor and quality, due in

some measure to their quick growth in the longer days of the brief Canada summer, and seeds of these famous melons fail to give as large and as good fruits in this region. Six of these melons, with the packing of hay, fill a box which would hold two bushels and a half, and \$2 00 each was the price asked on Saturday in the fancy-fruit stores. An exceptionally large one weighed twenty-four pounds, an average weight being from fifteen to eighteen pounds. Some of the so-called banana melons, from New Jersey, were seen in Washington Market last week, where they were regarded mainly as a curiosity, though a few found sale at twenty-five cents each. These melons are from twelve to fifteen inches long and three to five inches through, with greenish yellow and rather smooth skin, and fine-grained flesh without distinctive or rich flavor. Seeds of this melon were formerly offered in the catalogues, but no mention has been made for several years, owing to lack of demand for them.

In a late number of *The Cultivator and Country Gentleman*, Mr. W. C. Rockford, of Genesee County, Michigan, gives an interesting account of his experience last year in husking some 3,000 bushels of corn by machine. The cost of husking by the usual hand method is three to four cents a bushel in that section, and a saving of labor and probably of money was anticipated, since husking and shredding was accomplished at one operation. A powerful machine with steam motor was used, and the husking was well done, though some of the kernels were shelled in the process. But the shredding of the husks and stalks for fodder was the main consideration in this experiment, and while the stalks were crushed and flattened, they were not cut as fine as in the ordinary cutting-box operated by horsepower. The stalks were allowed to become thoroughly dry before husking, and the crushed fodder was stored in small stacks to prevent any possible souring. No trouble was experienced in this respect, although several days of heavy rains occurred at the completion of the work, and the stacks shed water almost perfectly. In this first year's experience with this machine an average of 400 bushels of very heavy corn was husked a day, and the cost, including labor and boarding, amounted to nearly five cents a bushel. Mr. Rockford's conclusion is that unless a machine can be had which shells the kernels less than this one did, the machine method is not practicable when the corn is intended for sale. There is also less waste of fodder when it is more finely cut by the old method, though the machine-cut stalks in some parts of the country are baled and sold in cities, where there is a growing demand for such provender at prices which compare favorably with hay.

At the annual meeting of the American Association of Economic Entomologists held in Detroit, August 12th and 13th, Dr. R. O. Howard, of the Department of Agriculture, Washington, District of Columbia, speaking of the effect of temperature upon the hibernation of injurious insects, stated that in experiments with such insects in cold storage a consecutive cold temperature proved favorable to successful hibernation, while a low temperature followed by a high one with a return to a low one, almost always resulted in death to the insect. The conclusion is that a steadily cold winter with a temperature even much below the average will usually be followed by an abundance of insects, and that after a winter characterized by alternate cold and warm spells, fewer individuals will survive. Besides a brief account of the practical work done by the Gypsy Moth Commission in Massachusetts, Professor H. K. Kirkland, of the Board of Agriculture of that state, reported that arsenate of lead seemed to be quite as effectual as Paris green as an insecticide, with cheapness in its favor, since it costs but seven cents a pound, whereas Paris green costs twenty to twenty-five cents. Other interesting subjects considered were The Weights of Bees and the Loads they Carry, in a paper by Professor C. P. Gillette, and The Lac and Wax from Insects, on which subject Dr. Howard said that while in some oriental countries industries of considerable importance have resulted from the use of these secretions, no such use has yet been made of them in this country, although several species of the scale insects yielding these substances exist in the southwestern part of the United States and may prove to have commercial value. For example, there is an almost unlimited quantity of a bark-louse of this class found upon Oaks of several species in California, and chemical investigations which are now being made have already demonstrated that wax of good quality may be dissolved from the insect mass by chloroform, and that an insoluble residue is left which much resembles rubber in its physical proportions. These chemical investigations are being continued, with much interest, for the supply of rubber is said to be decreasing, owing largely to waste in gathering it.

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Native Plants for Ornamental Planting.

WE spoke last week of the advisability of using indigenous plants for the adornment of small country places rather than the showy exotics and abnormal garden varieties which are generally preferred. We had in mind, especially, the resources of those beautiful thickly-wooded districts in northern New Jersey and southern New York where many residents of Manhattan have recently created summer homes for themselves. Let us now consider a little more carefully the supplies which Nature furnishes in these regions and the ways in which the owner of a small place would profit if, turning his back on the nurseryman and his seductive catalogues, he were wise enough to make use of them.

Where the forests have recently been cut away some of the largest and most vigorous trees have usually been retained—Sugar Maples, Hickories, Hemlocks, Beeches, Chestnuts and Oaks of several kinds; trees which had beaten their associates in the local struggle for life, and were therefore the finest that the given piece of ground supplied. But from about and beneath these their lesser companions have been removed; and then, where further planting was desired, trees from other regions or showy garden specimens have generally been introduced—Swiss and Austrian Pines, Blue Spruces from the Rocky Mountains, Lawson's Cypress, Beeches of weeping habit or with copper-colored foliage, *Prunus Pissardii*, cut-leaved Birches, striped *Negundos* and others. Little attempt has been made to group these introductions so that they will show at their best; and even if they were as agreeably arranged as possible, they would not harmonize with the native trees as well as would other species brought in from the native forest.

Here might be found in profusion, as has already been suggested, trees of various sizes and of the most diverse kinds of beauty—the Shad-bush and the Dogwood to bloom in early spring; the Yellow Birch, bright of bark and delicate of foliage; the *Sassafras*, with its peculiar leaves and varied tints of green; the White Pine, more delicate in its foliage and more picturesque in its habit than its Swiss and Austrian cousins; the Wild Cherry, with its profusion

of fruit; the Hop Hornbeam, with its tassels of seed, and many more besides. All of these would be more sure than foreign trees or garden varieties to grow finely under local conditions, and much more sure to harmonize well with the larger Maples, Oaks and Chestnuts. And there are other reasons also why it would seem, an intelligent planter should prefer to introduce them in his ornamental grounds. He need not fear that if he confined himself to them his place would lack individuality—would look too much like a corner reserved from the original forest, too little like a creation of art. In the forest secondary trees do not get a chance to develop fully and finely. They grow as they can, in thin and straggling shapes, sometimes stunted of their height, or often drawn out by their search for light into tall stems merely topped by a narrow head of foliage. Of course, even thus they minister to beauty, bringing their several quotas to the compound charm of the forest. But it is only here and there in the thinned border of the woods, or surviving by chance along the brookside or the margin of a meadow, that they give a hint of the beauty they might attain under freer conditions, and this can hardly be completely shown until they are placed in isolation where the hand of man can tend them. The Dogwood of the forest spreads admirable sheets of bloom among the stems and branches of its crowding neighbors. But if planted on a lawn it reveals unsuspected beauties of shape and foliage. The Red Cedar, which may be shapeless in the woods, will assume a strict pyramidal habit of admirable outline if grown by itself, and few imported pyramidal trees can do better service where a somewhat formal feature is desired. The Yellow Birch cannot reveal its possibilities of charm unless it is seen by itself, the delicate leafage sweeping the grass and the brilliant bark gleaming through it. The young White Pine, most often ragged and scrawny as it grows amid other close-pressing trees, is a compact, symmetrical mass of feathery needles when it has a better chance; and its progress from this shrub-like phase to the bold picturesqueness of its later years is one of the most interesting things in nature for the observant eye to watch. And so it is with every native tree: give it a better chance than the struggle for life of the forest affords and it will surprise us with unsuspected charms. It ought to be more interesting to an intelligent planter thus to develop the beauty of indigenous trees which will quickly and gratefully reward his care, than to cultivate exotics which are less well suited, perhaps, to local conditions, and with which he can hardly hope to achieve the same success that has been achieved by the practiced nurseryman from whom he has purchased them. To feel that he is completing Nature's intentions in developing the plants with which she has supplied his locality more perfectly than she is able to do, ought to satisfy him better than the effort to grow plants which she has meant should grow under different conditions, and to combine things which she has kept far apart. And, we repeat, the variety which he desires in his grounds may thus be amply secured.

The current preference for exotics and garden varieties seems even less comprehensible in regard to shrubs than in regard to trees. The Golden Elders, the piebald *Retinosporas*, stiff *Altheas* and coarse panicked *Hydrangeas*, which we see repeated in such wearisome profusion, are really less beautiful than our native shrubs—the Mountain Laurel, the *Viburnums*, the *Sumachs*, the Elders with black berries or red, the *Spiræas*, the New Jersey Tea, and a score of their congeners. And with vines and creepers the case may be even more strongly put. The region which we have now in mind supplies some of the most beautiful creeping and twining plants in the world; several kinds of Grape, one with broad, slightly lobed leaves and another with darker leaves deeply lobed into an almost architectural form; the Virginia Creeper, the Bittersweet, and the Virgin's Bower, a wealth of starry white blossoms in August and later loaded with long tufted seeds. Yet place after place in this region may be examined and no creeper be

seen, either on house or fence, except Honeysuckles (usually of the showy golden-leaved variety) and the Japanese Ivy of which we almost grew tired within the city's limits before the summer had really begun. Would not variety as well as beauty be better served if our native wealth in shrubs and vines as well as trees was utilized instead of the products of the commercial gardener?

Certainly in one important direction the interests of variety would be far better served, as regards both trees and shrubs, were native products more appreciated. The excuse that is offered for the employment of exotics and garden varieties is often that diversity in color is attractive. Therefore, Nature's harmony of summer greens is disturbed by masses of red and yellow and blotched-leaved plants. But while confusion is thus secured, real variety is not. Such bright-leaved plants remain the same from spring's beginning until autumn's end, and their very brightness, making them more conspicuous, only makes them seem more and more monotonous as the weeks go by. The real way to secure variety is to obtain plants which from week to week or month to month will change. Those which bear beautiful blossoms are to be preferred to those which have brilliant leaves; and if they are discreetly selected the succession of bloom may be kept up all summer. And then, if American plants are relied upon, autumn will bring a magnificent diversity of its own. What bright-hued plant can be named, as a factor toward variety in the pleasure-ground, which compares with the Dogwood—covered in spring with sheets of white blossoms, showing a beautiful spread of peculiar green in midsummer, in autumn turning to a vivid crimson, and keeping late into the winter its burden of scarlet berries? What foreign shrubs can give us the changeful effects which may be secured by a well-arranged bed of Sumachs of different kinds—showing diverse tints of green, ornamented in summer with bold panicles which are pale green, rosy, bright red, or deep brown in color, and in autumn becoming a glowing mass of ruddy foliage? What exotic has leaves more beautiful than the shining Tupelo's, or turns suddenly like the Tupelo to a gorgeous red, which lasts for many days or weeks? What task presented by any collection of alien trees and shrubs could be as interesting to the intelligent planter as the task of so adorning his grounds with American trees and shrubs that, after their varied kinds of spring and summer beauty have been enjoyed, a new and wonderful autumn symphony will develop, shading from the pale yellow of the Beech to the vivid yellows and reds of the different Maples, the scarlet of certain Oaks, and the dusky purple of the Ash, and emphasized by the still more brilliant reds of Tupelos, Sumachs, and Dogwoods? The very mention of a place adequately treated with this aim in view makes our customary arrays of yellow and striped and blotched and brownish garden plants—monotonously alike from year's end to end—seem by comparison, unintelligent, inert, and tiresome.

The Wayland Group of Plums.

IN an article in last week's issue of GARDEN AND FOREST I called attention to the continuity of the series of intergradations between the Americana and the Chicasaw Plums and said that the series might be roughly marked by three types, the Miner, the Wild Goose and the Schley or Clifford. It was also noted that another group, standing somewhat aside from this series, might, for the present at least, be regarded as belonging among the Hortulana Plums, and that this group is comparatively distinct and very interesting. This I have designated as the Wayland group* from one of its best types, the Wayland Plum. Golden Beauty is also a good type of this group, and is well known in the southern states, though not northward. Moreman is the commonest variety of the group in the northern states, but is not well known in the

south, and is not quite so good an exponent of the characters which mark this group. After considerable deliberation I think that Wayland is the best and most convenient group name for these varieties.

Of course, this group is not free from puzzling forms which show equivocal characters, apparently borrowed from the Chicasaws, Americanas and other groups; but on the whole it is much better marked than the Miner or Wild Goose sections, which have for several years been thought worthy of recognition. The varieties are characterized by straight, slender, dark-colored twigs, very large luxuriant foliage, broad leaves, which are often pubescent on the larger veins beneath, and which have from two to six glands on the petioles; axillary buds often triple; blossoms and fruit very late, mostly after Miner; fruit spherical, or nearly so, red or yellow, with many small dots, thin-skinned and of fine quality.

Several varieties of this group are already widely distributed in cultivation. Others of considerable promise have been recently introduced. Those which I have had the opportunity to examine, and which seem to belong with Wayland rather than in any other group, are Columbia, Crimson Beauty, Cumberland, Garfield, Golden Beauty, Kanawha, Leptune, Missouri Apricot, Moreman, Nimon, Reed, Sucker State, Wayland and Worldbeater. Mr. T. V. Munson, in correspondence, mentions another variety, Erby's September, growing in his grounds, which apparently belongs with those named here.

Of these varieties, Cumberland, Golden Beauty, Kanawha, Leptune, Reed and Wayland best show the distinctive foliage and tree characters which separate them from adjoining types. These are all good Plums from the planter's standpoint. All of them are very ornamental. Reed is one of the most beautiful trees of its size I ever saw.

These varieties have usually been put in the Wild Goose class, though Bailey, who has done most of the work in the classification of native Plums, puts Leptune, one of the best marked varieties, into the Miner group, and President Berckmans, who introduced Kanawha, says "this is beyond question a form of *Prunus Americana*." The whole group has also been roughly referred to *P. glandulosa*, Torr. & Gray, but this is evidently a mistake. Mr. T. V. Munson has given this question serious study, and has concluded that all these varieties are derived from *P. rivularis*, Scheele. This is a somewhat startling decision, and extremely important if true. The facts are, however, first, that we are yet too poorly acquainted with this species to make critical comparisons; second, that Scheele's description, made at second hand from Lindheimer's specimens, is not sufficiently precise to preclude mistakes; third, that the description,* what there is of it, fails, in important particulars, to fit the varieties in question; and fourth, that many of these varieties have originated in localities where it is almost impossible to believe that *P. rivularis* could be growing.

To particularize further, the National Herbarium† contains only the following specimens: Those of Lindheimer, collected in western Texas in 1846; one by Hall, from Dallas; two by Wolf, collected in Illinois in 1875 and very possibly cultivated specimens; and one of doubtful authenticity by Thomas Bassler, from Manhattan, Kansas. Other herbaria seem to have no better representation of the species, and this could hardly be the case were it so common

* Since this description is inaccessible to many students, it will be well to transcribe it here:

Prunus rivularis, Scheele, *Linnaea*, 21, 594. Frutex 3-6 pedalis; rami angulati glabri nitidi cinerei verruculosi, verrucae parvae confertae. Petioli glandulosi canaliculati puberuli. Folia ovate-oblonga acuminata inaequaliter serrulata, basi glandulosa, subtus sparsim pubescentia, supra glabra, serraturae callosae confertae. Umbellae laterales sessiles, subbifidae. Squamulae gemmae floriferae aphyllae. Pedunculi glabri elongati subglandulosi, petiolumaequant. Flores Drupa rubra globosa glabra nitida acida.

"Gesellschaftlich an Bachrändern, seltener aber jedesmal in Menge zusammenstehend auf Hügeln. Strauch 3-6' hoch, Frucht kugelig, hell roth, angenehm säuerlich, von der Grösse einer Kirsche bis zu der einer Mirabelle, $\frac{1}{4}$ -1" dick. Die Tawakong-Indianer sollen die Frucht, mit honig gekocht, sehr lieben. Die Texaner nennen sie 'Tawakong plum'." Lindheimer.

Gehört zur Rote Fageneus, Torr. & Gray.
Seltener stehen die Blumen einzeln.

† The specimens in the National Herbarium were kindly examined for me by Mr. Lyster H. Dewey.

* Vermont Experiment Station, 10th Report, p. 103.

and so widely distributed as to furnish the well-known cultivated varieties mentioned above. The varieties in question differ from Scheele's description in having single straight trunks, in being from fifteen to twenty feet high, instead of from three to six feet, and in having often three flowers to each fascicle, instead of one or two. The distribution of the species is given by Coulter* as "not uncommon on the Colorado and its tributaries, and extending to the upper Guadalupe and the Leona," and the specimens referred to above give no important evidence of its occurrence this side of western Texas. In comparison with this distribution the origin of the cultivated varieties should be carefully considered. As far as known their sources are as follows: Cumberland, Tennessee; Garfield, Ohio; Golden Beauty, south-west Texas; Kanawha, Fairview, Kentucky; Leptune, Arkansas; Missouri Apricot, Missouri; Moreman, Kentucky; Sucker State, Illinois; Wayland, Cadiz, Kentucky.

The evidence of this list is quite contrary to the supposition of a *Prunus rivularis* parentage for the varieties named; but, on the other hand, must be regarded as decidedly favorable to their classification in the pseudo-species, *P. hortulana*.

It seems to me important that this group of Plums should be understood separately, and that its relationships should be worked out as speedily and as accurately as possible; and while the evidence here reviewed leads me to reject the hypothesis of their derivation from *Prunus rivularis*, that species seems to be a promising one, and we would do well not to lose sight of it too soon.

University of Vermont.

F. A. Waugh.

What Can be Done in Nine Years.

MANY persons think it is useless to plant trees because so many years will be required for their growth that the planter will not live to sit under their shade, and can never enjoy the fruit of his labors. This is clearly a mistake. From personal experience on a most unpromising piece of ground, I am prepared to say that three years' work will produce an encouraging effect almost anywhere if one goes about it in the right way; that in five years trees will be well enough along to be ornamental, while in ten years one may have a really beautiful place if it is properly planted to begin with.

An account of our inexperienced beginnings at Overlea was published in GARDEN AND FOREST six years ago (see vol. iv.), and to those who were interested in that story this account will not be without a certain value, as it will show how a little place can be rescued from total neglect and desolation and turned from an eyesore into an ornament of the village in a few short years. One decade counts for little in a life, and it must be remembered that not half of that time was required here to produce valuable and effective results, even with imperfect knowledge and very moderate expense. We began on our abandoned farm by planting a screen of Willows along the straight street which separates it from the salt marsh of which it was originally a part. These Willows, it may be remembered, were driven down as stakes, without a leaf or branch, along the boundary, and set as closely as possible in a row. Some of these have now reached the height of forty-five feet, and a large one within the line, in a particularly propitious situation where it had room to spread, left, when it was felled last year, a butt considerably over two feet in diameter. All have not grown equally fast, for some of them had to be moved, and others, being set along the street made by filling in across the salt-marshes, had a very stony foundation as well as an occasional dose of salt-water from a high tide, and grew feebly. These, however, exist just where we desire to have them as a hedge, and their tops are kept down that we may view the meadow on the other side, so that their lack of vigor is an advantage. By vigorous pruning they have assumed a round bushy form, thick at

the base, and the road outside is completely hidden from sight.

A White Willow, already of good size when set out in 1888 near the house for immediate shade, has spread widely from having been polled in the beginning, but is ten feet shorter than the trees which have grown from stakes. A Golden Osier carried in my hand from a neighbor's house in 1889, and transplanted twice, now measures thirty-nine feet in height, having run up a long leader, always much bent over by the prevailing south-west winds of this region. Both these trees are set upon a sandy knoll with no moisture, whereas the fine specimen which was cut down had its roots in the fresh meadow, where it was always well watered and supplied with good soil.

The Willow at the south-west corner of the house we always intended to remove after a few years, to leave room for a Maple beyond it. But though the branches of the two now touch, it is so pleasant and important a neighbor that we have not yet found resolution to take it away. The fact is that the planting of nurses for trees results in subsequent pangs, for by the time the nurse ought to come down it has grown dear and necessary, and though it is injuring its charge, the charge is still incompetent to take its place. Then one is sure to weakly succumb and temporize after our feeble human fashion, preferring, as we do, present comfort to future good. Nobody but the born philosopher has the courage "*de se tourmenter pendant la vie pour qu'on parle de lui quand il soit mort*." Strive as we may, our philosophy is ever tempered with weak-hearted relenting toward those branches which have first shaded our bare walls, even though we have sense enough to be ashamed of it. To cut down a tree and sit in the sun for two or three years until another grows large enough to take its place, is more than we can do yet, but no doubt we shall come to it.

Next to the Willows the Maples are our tallest trees, and the crowning glory of the front of the grounds is a symmetrical White Cut-leaved Maple, which, but an eight-foot feather-duster in the summer of 1888, is now more than thirty-five feet high, with a spread of nearly thirty feet. This tree grows on the gravelly knoll on which the house stands, its only advantage being that it had a wide, deep hole dug for it, into which seven loads of loam were dumped when it was planted. Such a tree set out in congenial soil would probably be much larger, but my object is not to show what can be done with favorable conditions, but with those which at the outset seemed most unpromising. The result goes to prove that if a good bed is made for a tree at the start, and plenty of water and top-dressing are supplied for two or three years, it will afterward be in condition to get its own living, even from such poor pickings as a gravel bank affords; and that no one should hesitate on account of seemingly impossible soil to give a tree a chance by a slight expenditure in the first place, to show its powers of growth and endurance. The White Maple flourishes here, in glacial débris, with a number of other trees within thirty feet of it, and is quick of growth and particularly agreeable in outline. Its lower branches have a graceful downward sweep to the ground, with the tips mounting up again in a curve; the foliage is a cheerful light green of very open and airy character, so that the sunlight is not excluded from the turf below. The one I speak of was eighteen inches in circumference two feet from the ground at the time it was transplanted, and now measures three feet around in the same place.

Two good-sized Norway Maples, transplanted in January, 1888, are now as tall as the ridge-pole of the house. They were too severely cut back at first, our knowledge of a tree's necessities being at that time very limited, and consequently they made too many branches and have to be thinned out every June, the best month for pruning Maples. The largest of these trees is about three feet in circumference at the base, with a shock head, very thick and round, but not particularly graceful, and is about twenty-five feet high. Its neighbor is much more beautiful in form

* Botany of Western Texas, Coll., U. S. Nat. Herb., vol. ii., p. 102.

and is a little taller, while a third of the same species planted sixteen months later, when much smaller than the others, overtops them both, though it has not so great lateral extent. This goes to prove what the authorities state, that in the long run small transplanted trees outgrow large ones. The offset to this fact is that the latter give you more shade immediately, while you are waiting for their younger neighbors to attain their height.

So far as our observation goes the larger the tree transplanted the more stationary it remains, if it remains at all, which is most unlikely. A few years ago a man from the west came to this town and offered for a large price, ranging from forty to a hundred dollars each, to move trees of any size and warrant them to live. A machine was used to lift them after the roots had been cut off too near the trunk. The great Oaks and Elms moved for some of our neighbors, while ornamental for a couple of years then began to die. In a few instances, where the trees were planted in excellent soil and had continuous care in the way of watering and top-dressing, the experiment was justified, though these have merely held their own, and most of the trees were lost.

We planted a number of acorns of English Oaks eight years ago, and the tallest trees from these are about twenty feet high, and are vigorous and beautiful. They have not had a very good chance to show what they could do, for the swale in which they grow is sandy from the wash of the road, and very tightly packed and grassy, as it has not been disturbed for many years. Into the same dry, unfavorable soil we transplanted six young Chestnuts in 1888, but an insect dwarfs their early spring growth every year, and they do not like the salt east winds to which they are exposed. They are well rooted and healthy enough, but make slow progress skyward, and are not yet twenty-five feet high. Some Chestnut seedlings planted later promise to do better than the saplings, and are fast overtaking them, though rooted in the cold gravelly north side of the hill. Here, too, young Walnuts and Oaks are beginning to show among the Pines, and Gray Birches flourish in a race with the evergreens.

In one corner of the narrow front lawn which separates us by about ninety feet from the village street, flourishes a clump of five different kinds of Birches, and these, born to live on little, content themselves cheerfully with the scanty living sucked from the thin soil in which they grow. Of these five the common European Birch, *Betula alba*, with its white stem gleaming through the clustering curly branches which closely encircle it, is the tallest and most vigorous, and with its bright small leaves and numerous tassels is a pleasing feature in the group. Near it a Cut-leaved form of this Birch grows tall and spindling, with sparse foliage, casting dancing shadows on the grass. Its stem is of smooth and dazzling whiteness, and its pointed, deeply indented leaves make a delicate tracery against the sky. In the foreground stands a Paper Birch, *B. papyrifera*, from Maine, with large shining leaves. Its bark has a warmer tone than that of the European Birches, and is flecked with dark spots. It grows more slowly, too, probably because it is only a scion which came up from the root of an apparently dead sapling that did not survive its first winter, and therefore has not the vigor of an original stem. It is dear to us, for it brings with it a suggestion of the northern woods where it grew, where its stately ancestors still furnish canoes to the Passamaquoddy Indians, and we watch with interest the changing hues of its rolling bark, and enjoy its gradual alteration from a dark sapling to a white trunk with the familiar dark gray diversifications. A young Yellow Birch, *B. lutea*, stands in the neighborhood, but whether from poor soil or its own habit has never advanced. Behind the group, and nearest the street, is a good-sized native Gray Birch, *B. populifolia*, which was a wayside bush preserved when we graded the knoll. This and a tiny White Ash, *Fraxinus Americana*, were the only green things upon the lawn when we began, and now the latter has grown into a stout, wide-spreading

tree which robs everything in its neighborhood. While not so rapid a grower as some of the other trees, it bids fair to survive and overtop them all before many years. It struggles now with a transplanted Black Oak for mastery of the situation.

The greatest surprise of all on this small, crowded lawn is *Catalpa speciosa*, whose tropical foliage and great spires of enchanting bloom would seem to require far more sustaining food than it can possibly find on this slope. In a dry season it has a trick of dropping many of its first leaves when the second growth begins, but this year it has shed but few, owing to frequent rains. It spreads its wide arms and flutters its huge leaves, and is altogether the most foreign looking tree in the collection. Its top blew off in a gale three years ago, and this seemed to add to its spread. If it would only not wait until the middle of June to develop its leaves and begin to drop them early in September, no tree would be a more splendid inheritor of the earth. It is really a joy to behold in its perfection, it is so luxuriant and brave in its golden-green array. A photograph of the house taken in 1888 shows it standing up hard and bare against the sky. No vines nor shrubs link the foundations to the grassy terrace. Little sticks with plummy tops stand about at what seem wide and hopeless intervals, a few stems indicate the presence of future creepers, and the gravelled driveways look enormously out of proportion to the turfed spaces. The whole aspect was then hopelessly dreary and bleak but for the fine stretch of picturesque meadow.

A photograph taken in 1891 shows a pretty little group of trees already well started about the dwelling, and one made for me by a friend this month from the same point of view, only reveals the north gable end of the building which has been left unshaded for the sake of the prospect from its windows. All the rest of the house is hidden by foliage, draped in vines, or buried in shrubbery, so that only the chimneys are seen peering up amid the nodding tops of a grove of well-grown trees, which by another year will conceal even these altogether.

All this is the result of only nine years' growth, and goes to prove how well the careful planter is recompensed for his efforts.

Hingham, Mass.

Mary C Robbins.

Plant Notes.

Romneya Coulteri.

FEW California plants are better known by repute to growers of hardy plants than *Romneya Coulteri*. Unfortunately, few in the east have had the opportunity to establish it, owing to the scarcity of proper material. The seeds offered by the dealers will hardly germinate in less than a year, and there are many contingencies from the planting of such seeds until their growth into plants strong enough to produce flowers. Roots have been only occasionally offered, mostly weak bits which have soon joined the majority, and the desire to grow this Poppywort has probably mostly abated. This is unfortunate, for it is a plant of most distinct habit, with beautiful flowers, and in my experience not difficult to establish and grow in the open in this latitude. Mr. Sturtevant kindly sent me some strong roots four years ago which were planted in a warm border at the south side of the house. During the three winters to which they have been exposed they have been protected simply by a mound of earth about a foot high and topped with ashes. This unsightly device is a very useful one for plants of which one is doubtful, or which it is desired to protect from quick thawing and freezing, the bane of hardy-plant culture in this changeable climate. A strong root has produced during these seasons a varying number of stems, this year twenty, although this number has been exceeded previously. The plants would spread by creeping roots if allowed to do so. The growth of the stems is about five feet, and they reach this length in May. They are always somewhat prostrate, the strongest growing only partly erect. As the smooth, pithy stems are brittle, the plant should

have protection from the wind. The leaves are persistent and lose their vitality with the storms in early winter, and as they show no signs of ripening previously it is fair to suppose that in a milder climate they would be of more than annual duration.

Though growing well each season it has not flowered with me until this year; the failure is evidently due to the production of too much thin wood. The flowering shoots this year are fewer and thicker and the plant evidently requires judicious thinning, and perhaps some fertilizer. The flowers are produced at the top of the stems, there being a crown-bud and two or three terminals on short, leafy stems. The pure white flowers, with six much-crimped petals, are from five to six inches across and have a hemispherical mass of golden stamens surrounding the ovary. The illustration on this page scarcely does justice to its beauty of form, for its petals are often contorted, and being of delicate texture and swayed by each breath of air there is always a beautiful play of life and

distinct character of this new break appears in the flowers, which are in the usual colorings and single, but sometimes attached to all the petals, and sometimes to only either the inner or outer pair. A growth springs from the lower section, but not from the base of the petals. As this growth becomes free it takes on crested forms which are unique, being very irregular and decidedly attractive. The centres of the Single Tuberous Begonias have always been quite bald, or rather unattractive, and this new strain is a gain in beauty as well as an extremely interesting example of a floral metamorphosis, further phases of which may be expected. A single flower with growth of similar character was shown in an exhibition in the Grand Central Palace, in this city, some five years ago, by the Oasis Nursery Company, which, of course, is an illustration of the familiar fact that plant sports usually occur in several places at the same time. I have been expecting and hoping for some years that some one would select or secure a strain of Tuberous Begonias with brilliant leaves. It appears to be within the



Fig. 46.—A Flower of *Romneya Coulteri*.—See page 352.

light over it as the illumination changes. The petals seem peculiarly sensitive to light, opening wide in full sunlight and partly folding under duller rays. As each flower lasts three days this sensitiveness of the petal is useful, for late in the afternoon two of the inner petals fold up over the stamens and protect the pollen from dew or dampness. Though this plant does not flower profusely under ordinary conditions, it seems to be a good subject for the attentions of a deft cultivator, for there springs from each leaf-axil a short leafy stem which apparently might be converted into a flowering shoot with proper cultural skill.

CRESTED BEGONIAS.—Under the somewhat cumbersome, but descriptive name of *Begonia grandiflora erecta cristata*, Messrs. Vilmorin introduced last year a new type of tuberous Begonias. This new strain is said to have been obtained or selected by Messrs. Vallerand Freres, and is so far fixed that a fair proportion of seedlings is said to come true. The tubers and foliage are of the ordinary type of tuberous Begonias, now familiar to all gardeners. The

possibilities, for a plant here some years ago gave a promise of brilliant foliage by producing a stem with leaves of the richest colorings. Unfortunately tubers were very plentiful at that time, and the promising one was lost in the rabble.

Elizabeth, N. J.

J. N. Gerard.

Cultural Department.

Hybridizing Sarracenias.

OWING to their odd shapes, and in some cases their beautifully marked leaves, the Sarracenias are much prized in European collections; indeed, more highly than they are here in their native country. During recent years some remarkably handsome hybrids have been raised, especially from the dwarf-growing species. The leaves of all the species are hollow; some resemble pitchers and others are trumpet-shaped. Five of the species are protected by a hood-like covering on the top; *S. purpurea* is unprotected. All of the species ensnare insects by an arrangement of hairs on the

inner portion of the tube. On the part nearest the orifice of the tube even the house-fly cannot obtain a foothold. The lower portion is covered with a multitude of hairs barely visible to the naked eye, and their ends are directed toward the bottom of the cavity. When an insect is once inside the chances are greatly against its regaining its liberty.

The flowers are quite as curiously formed as the leaves. The style expands at the summit into a structure exactly resembling an umbrella, which is composed of five divisions, and each division terminates with a small hooked stigma. The long petals, five in number, protrude from between the divisions of the style. The stamens are quite numerous. There are six species, all native of the Atlantic states. Five of these are found only south of Virginia; the other species, *Sarracenia purpurea*, ranges from Florida to the most northerly point in the New England states. *S. psittacina* is the least attractive of those, having small pitchers shaped like the head of a parrot. *S. variolaris* grows about ten inches high; the hood is more perfectly developed than in any of the other species. On the top of this hood are whitish, almost transparent, spots, the purpose of which has not been made clear. The color of the flower is yellow. The only other yellow-flowered species is *S. flava*, the most common of the southern species. It grows to a height of from one to three feet. The prevailing color is greenish yellow, with beautiful reddish brown markings on the under part of the hood and a little way down the tube. *S. Drummondii*, from a horticultural point of view, is the most attractive species. Like *S. flava*, it is an erect-growing species. Its beauty lies in the hood and the upper portion of the tube, which are white veined with dark purple, and a well-grown plant never fails to excite admiration. It grows in the almost impenetrable swamps of Florida. *S. rubra* is a low-growing species with numerous narrow pitchers. The flowers are very sweet-scented and their odor somewhat resembles that of the common English Violet. The common or best-known species is *S. purpurea*; like those of *S. psittacina*, the pitchers are prostrate on the ground.

Among the numerous hybrid forms there are several with very large pitchers, such as *Sarracenia Chelsonii*, a hybrid between *S. rubra* and *S. purpurea*. This species colors up well, but is inferior in markings to *S. purpurea* as it is found growing in favorable situations about Wilmington, North Carolina. A cross between *S. variolaris* and *S. purpurea*, named *S. Swaniana*, has the broad form of the latter, while the light markings of *S. variolaris* are intensified. One of the handsomest hybrids is *S. Formosa*, between *S. psittacina* and *S. variolaris*. The form is nearly intermediate and the rich markings characteristic of *S. variolaris* are seen all over the upper part of the pitcher. All the species of *Sarracenia* intercross very readily under cultivation, and not a few natural hybrids have been found in the native wilds of these plants. If there are several plants of each species in a collection and each comes into bloom at the same time, which is an easy matter to accomplish by putting the backward ones into a little heat, there is no difficulty in raising an endless variety of hybrids. If some of the best of the hybrid forms already in cultivation were used as pollen parents the resulting seedlings would probably develop something entirely new. Two or three years ago I had the pleasure of raising many hundreds of seedlings, using all of the species as seed-bearers, and some of them along with already existing hybrids as pollen parents. So readily did they intercross that not a single flower failed to set seed. Of the hundreds of plants grown from the seed those having *S. Drummondii* or *S. flava* blood in them, no matter what they were crossed with, were always much inferior to the parents both in form and color. One set between *S. Drummondii* and *S. crispata*, the former being the seed-bearer, has more dark purple than there is in *S. Drummondii*. The most satisfactory results were obtained by using *S. psittacina* as a seed-bearer, taking the pollen of *S. variolaris* or *S. purpurea*, or even hybrids of these species. *S. variolaris* is also a good species to select as a seed-bearer. *S. purpurea* crossed with any of the species excepting *S. Drummondii* or *S. flava* gives some pleasing forms.

Although the raising of new varieties of *Sarracenia* through hybridizing is an easy matter, no small details should be neglected, or good results will not be secured. It is safest to keep the seed-bearing plants by themselves, and when the flowers are unfolding their petals, or just before the anthers shed their pollen, the stamens should be removed with a small pair of sharply-pointed scissors. The pollen to be used is in excellent condition when it falls on the concave surface of the expanded style. A little should be taken on the point of a camel's-hair brush, just enough to cover the five stigmas which are situated on the under parts of the extremities of the

divisions of the umbrella-shaped style. To prevent confusion a label should be tied to each fertilized flower, containing the names of the parents, the seed-bearer first. The seed will ripen in time to sow and have the seedlings about an inch and a half high before the approach of winter. A good mixture in which to sow them may be made up of two parts chopped sphagnum and one part charcoal, rough-grained sand and broken pots small enough to go through a quarter-inch sieve. This should be mixed thoroughly, firmly pressed, and the seeds covered but slightly. A pane of glass should be placed over the top of the seed-pans, and these should be stood in the shady part of a cool house. The two seed-leaves are about half an inch in length and quite narrow; the first true leaf reveals the genus to which they belong. At this stage they may be pricked off around the edge of a three-inch pot, putting eight or ten in a pot, in the soil already described, and they will pass the winter safely in these pots. When they begin to grow in spring they should be singled out into two-inch pots, giving a little fibrous peat with the soil mixture.

Botanic Garden, Washington, D. C.

G. W. Oliver.

Seasonable Notes.

LASIANDRA MACRANTHUM, perhaps better known under its old name of *Pleroma macranthum*, is a welcome addition to the few greenhouse plants in bloom at this season. The flowers, which are of a beautiful deep violet-purple color, are freely produced at the ends of the shoots in branchlets, and although the flowers only last about twenty-four hours, new ones open every day, and the flowering season continues through several weeks. From cuttings inserted in April we have now nice, bushy plants, in six-inch pots, but to grow this plant most successfully it requires to be kept two or three years and trained on a wall or tied to some wires on the side of a cool house. With a fair amount of root-space under such conditions it blooms for a long time and commands attention from all who see it. *Lasiandras* are of the easiest possible cultivation. They are not seen in many places, probably owing to the short-lived nature of their flowers and the fact that they have no value for cutting.

Caryopteris mastacanthus, which has been quite extensively advertised as a novelty during the last year, is really an old plant, having been introduced from China as long ago as 1844. I remember seeing the plant grow freely on a warm border in a garden near the Scotch border twenty years ago. It was then called *Mastacanthus Sinensis*. It made quite a neat little bush, but was not held in any particular esteem, and did not prove reliably hardy there, but a scattering of broken fern overhead and a mulching of manure at the root carried it through the winter safely. I saw well-grown small bushes of it last summer in the south of England, where it was said to be quite hardy. It is only occasionally seen even in England. When exhibited by Mr. Manning, of Reading, last year in Boston, it won a silver medal. It attracted much notice there and was described in some of the papers as a new introduction from China and called *Blue Spiræa*. A more correct name would be *Blue Verbenæ*, belonging as it does to the order of *Verbenaceæ*. I am unable to state whether *C. mastacanthus* is hardy in this climate, and it is probably not. It germinates freely, and from seeds sown about March 15th we now have good plants in bloom in six-inch pots. The flowers and plants are lavender-blue. In catalogues they are described as azure-blue and rich violet. The plant as we knew it two decades ago bore flowers of the lighter shade. There is a pure white form of *Caryopteris* which I have not yet found, but which is said to be an excellent companion to the blue one.

Chrysanthemum Golden Fleece is useful grown in a row by itself, or dotted here and there, as we grow it, in the perennial beds. Yellow flowers are perhaps too much in evidence at this season, with so many *Helianthus*, *Heliopsis*, *Rudbeckias*, *Coreopsis*, etc., but on account of its height (about two feet) and its persistent blooming qualities, this *Chrysanthemum* is worthy of a place in every flower border. It begins to flower with us about July 20th, and continues until cut down by frost. It proved perfectly hardy here during the past two winters, only a few half-decayed leaves being scattered over each clump. The flowers are extremely useful for cutting.

Taunton, Mass.

W. N. Craig.

Work of the Season.

THE replanting of Carnations must now be attended to promptly, and the weight of opinion is in favor of having them under glass by the first or second week of September.

The plants are thus much more under control than if the operation is postponed. Care in lifting the plants is necessary to keep the roots entire, but a large ball of earth does not seem to be essential. Indeed, some growers go to the opposite extreme and shake off all the soil from the roots before replanting, and they claim that a better start is gained by this plan. When this is done rather more care is required in frequent syringing and ventilation until the plants become established in their new quarters. After the Carnations have begun to grow again but little syringing is needful, and during the dull and damp days of fall and winter no water from overhead is the safest rule. About five to six inches of soil on the bench is sufficient for Carnations, but this should be of good quality. Well-rotted sod is the best material, and of fertilizers, stable manure, wood-ashes and bone-dust are among the most satisfactory, and should be used in such proportions as are best adapted to the particular soil used.

Improved methods of staking and tying Carnations are still being discussed by the experts, many of whom have devised wire stakes of special form for this purpose, so as to support the plant neatly and admit plenty of light and air.

The frequent and unusually heavy summer rains in the eastern states have proved quite disastrous to Carnation-growers in some sections. One instance noted recently is that of a florist in Connecticut who planted out 16,000 Carnations in the spring, and at this time has only about 3,000 live plants, the remainder having been destroyed by wet weather.

Cyclamens that have been growing in frames during the summer will also be safer in the greenhouse from this time onward, for the damp and chilly nights of early autumn are likely to injure these useful plants. While in growth Cyclamens should never become very dry, yet an overplus of water also checks them.

Acacias, Azaleas and other hard-wooded greenhouse plants may remain out-of-doors for some time yet without injury; in fact, the early housing of plants of this character may induce a secondary growth, and to some extent interfere with their spring flowering.

Poinsettias should be brought under cover, for too much rain and chilly nights cause loss of roots, and consequently of the lower leaves, and frequently change a promising lot of plants into the unsightly specimens so often seen.

Lilium longiflorum and *L. Harrisii* should be left out in frames for the present unless they are intended for very early forcing. The 1st of October is a good time to transfer them to the greenhouse, and in favorable seasons I have sometimes left them out until November 1st, as a stronger root-growth is thus gained. The tops are in this way kept short-jointed and sturdy, and no staking is required unless the plants are packed for shipment.

Young Begonias for winter flowering, of which the *Incarnata* varieties, those of the *Socotrana* section (for example, *B. Gloire de Sceaux* and *B. John Heal*) and *B. Digswelliana* are among the most useful, may need another shift to give sufficient root-space to carry them through the season. Six-inch pots are a convenient size to use for well-grown and showy plants for conservatory decoration.

Show *Pelargoniums* are also admirable for the conservatory in spring and early summer, and while these plants may be kept outdoors to advantage during the summer months, it is not advisable to leave them out late. The heavy rains and cool nights affect these plants unfavorably, as they require but little water during fall and winter. A few strong young clumps of *Arundo donax* now lifted from the garden and potted up in large pots or tubs, will be found a useful addition to the conservatory plants during the winter; not only for their graceful habit and beauty of foliage, but the shoots may be cut and used effectively among cut flowers for filling large vases.

Holmesburg, Pa.

W. H. Taplin.

Chrysanthemums and Rex Begonias.

FROM this time onward will be a critical period for Chrysanthemums. Plants in pots have now filled them with roots, and to keep the plants in good condition they must be fed, and judgment and experience are necessary in the proper application of nourishment. The misuse of a fertilizer may spoil a season's work, not taking into account the worry and disappointment. I know how easy it is to make mistakes and also the danger of repeating the error. The grower must feel his way, especially with a stimulant of whose strength he is uncertain. Drainage from the stable is safe, diluted to one-eighth strength, or until it has the color of weak tea. An application once each week is sufficient for the first month, but the cultivator must be guided by the foliage area. Change of diet is

good for plants as well as for men, and at intervals sheep-manure water may be applied, and occasionally soot-water. These latter mixtures we make by putting the materials in a coarse bag and letting the strength leach through. If worms are troublesome, a little lime-water will drive them away and benefit the plants as well. As the season advances we may try a little of Albert's Horticultural Manure. Its action is quick for benefit as well as injury. A pound to fifty gallons of water is full strength, and a weaker solution would be safer. This manure gives a fine color to the foliage.

Rex Begonias are now in full beauty. While they are more or less evergreen they are benefited by a season of rest, but it is surprising how much hardship they will endure so long as the atmospheric conditions are suitable. Seedlings and broken parts of leaves frequently take root in gravel or under the greenhouse benches. A favorite place for them is the walls of artistic ferneries, with little else than decayed moss and charcoal to root in. Rex Begonias are an attractive feature in the grotto on the estate of the late F. L. Ames, at North Easton. On the Simpson place, at Saxonville, they are used in the same way, and their large glistening, often iridescent, obliquely cordate leaves stand in bold relief from the walls. Upon remarking to a friend how well they did on the dark side of his tropical plant house, and that the close atmosphere of such a place suited them, he directed me to the greenhouses belonging to Mr. J. D. Little, of Brookline, Massachusetts, and I there found the handsomest plants I have ever seen, growing under very different conditions. The plants were in an old-fashioned lean-to with front ventilators and heavy eaves, under the shade of which they were growing.

The typical Rex Begonia is characterized by a surface-growing rhizome, all the leaves being radical. Besides the type the collection includes a large number of hybrids, which, while maintaining the zonal character of the type, are more shrubby in habit, and often have deeply cut foliage. It is difficult to trace the parentage of many of these hybrids, although the blood of *B. diadema* and *B. Olbia* is plainly seen in many of them.

A description of some of the most striking varieties must include *Lesondsii*, dark and light green with silver spots and margin; *Magnifica*, deep bronze, with lighter green spots; *Mrs. E. Bonner*, hybrid Rex, shrubby, the leaves very much divided, silvery, with dark centre; *Madame Treive*, hybrid Rex, dark and light green shadings, with silver band; *Fendeleit*, dark green, silver spotted, the raised midribs stained with red; *Desfontaine*, finely spotted, with band of silver, reddish hue; *Annie Dorner*, hybrid Rex, cut-leaved, dark and light green, spotted slightly; *Bertha McGreggor*, hybrid Rex, dark centre, with bands of silver and bronze; *Mrs. Bonner*, long-pointed, silvery green, dark edge, very fine. There are many other fine varieties, but these are the best.

Wellesley, Mass.

T. D. Hatfield.

Antirrhinums.

THIS genus, though not extensive, contains several species all more or less hardy and mostly herbaceous. The majority are mainly useful for rock-work, but probably the best of all is the old-fashioned Snapdragon, *Antirrhinum majus*, and its numerous varieties. These easily lead all the other species in variation and brilliancy of coloring. Names have been given to some of the more distinct varieties, but few growers take the trouble of keeping them true to name.

These plants are often classed among hardy herbaceous plants, but I have never found them quite hardy in this section. When it is desirable to perpetuate some of the most distinct varieties I find it necessary to strike cuttings in September and winter them in cold frames, planting them out when the ground has become dry enough to work in spring. These plants bloom much earlier than those grown from seed unless the seed is sown in fall and the seedlings wintered in the same way. Under favorable conditions the plants usually begin to flower in May. They are useful as bedding plants and in the herbaceous border.

The readiest and most common method of obtaining plants is from seed, and one packet selected from a good strain will give all the variety desired. If sown in the greenhouse in March and grown with care they will flower by July and continue throughout the summer season. Though of the easiest culture, they will repay a little extra attention. Too often they are crowded together and receive little or no attention, with the result that their true character is not brought out and much of their beauty is lost. They should be planted in well-enriched ground and sufficient space allowed for the development of each plant, with proper attention to staking and tying. The handsome flower-spikes will fully repay this care.

Tarrytown, N. Y.

William Scott.

Carex Japonica.—This pretty little Grass, with yellow and green striped foliage, proves useful in many ways, and small plants in four-inch pots, alternated along the outside of a table with plants of *Isolepis gracilis*, make a pretty arrangement. It is also attractive with Ferns in artistic basket-work, and for Fern cases. A few plants out-of-doors have stood the sun well, and it evidently will prove a good bedding-plant.

Clematis tubulosa.—This shrubby plant is one of the most striking features in the border at this season. It forms a neat, low, rounded bush just now, and is covered with small deep blue flowers. It is especially suitable for planting on hillsides and in a low shrubbery.

Kelway's Delphinium, Princess of Wales.—This is the first white perennial Larkspur I remember ever to have seen. Only the few deformed petals which form the shield for the stamens are dark-colored. The sepals are the showy part of the flower, and are often mistaken for petals.

Violas, or Tufted Pansies.—A bed of these yellow and blue flowered plants has interested many visitors, who mistake them for Pansies. But while the flowers of Pansies grow smaller as summer advances, Violas, which are summer-blooming, are then at their best. They are easily raised from seed sown in spring.

Wellesley, Mass.

T. D. H.

Correspondence.

Notes from West Virginia.

To the Editor of GARDEN AND FOREST :

Sir,—Varieties of *Hibiscus Syriacus*, commonly called *Althæas*, are freely planted in this neighborhood. Although rather stiff-looking shrubs, they are useful at this season of the year, for they are in bloom throughout several weeks of late summer and early autumn, and, with the exception of some *Hydrangeas* and a few other plants, are the only shrubs now in flower. For want of other material, we often use *Althæas* for cut flowers for the house and also for the decoration of the little church in the village near which Rose Brake is situated. Generous branches cut from the shrubs are quite effective in large jars and vases. A recent arrangement of these flowers had several attractive features which I would like to describe. Jars for corners and fire-places were filled with sprays of the pale rose-colored single *Althæas*; others with the pure white variety which has deep maroon-red centres. Double and semi-double flesh and peach blossom-colored *Althæas* were also used in masses, each variety by itself. In smaller vases the light-toned and white kinds were combined with foliage of a Japanese *Snowball* and many tall heads of *Wild Carrot* to soften and give variety to the effect. The particular *Snowball* used is one that differs from all others of its kind that I have seen. It is planted upon a rock, and, possibly because of poor nourishment, has foliage of a uniform dull red color all summer long. It never shows a single green leaf, and, although we do not prize it especially for its effect in the shrubbery, we have found the peculiar tint of its foliage quite attractive in decorative arrangements. The contrast of its rich, subdued coloring with the cool-looking deep green of the *Althæa* foliage, starred with its handsome flowers, is excellent. In this arrangement care was taken to avoid a flat effect by using long sprays and by cutting the *Wild Carrot* with some long stems.

At another time large vases and bowls were filled with the full cream-colored heads of *Hydrangea grandiflora* mingled with sprays of the purple-leaved *Barberry*, which are not purple in reality, but a mingling of rich crimson, dark wine-color and tints of dull green. Sunflowers used alone, or with masses of the tropical-looking foliage of *Aralia* and *Sumach*, were found effective at another time. The largest flowers were used for corners in the hall and for fire-places, and the smaller ones for stands and mantel decoration.

Almost all of our garden flowers now in bloom, such as Dahlias, Marigolds, Zinnias, Phlox and China Asters, have a stiff aspect, which makes them less desirable for cut flowers than their wild neighbors of copse and field. Vines, however, whether wild or cultivated, are never stiff, and I wish here to call attention to the beauty of the common Trumpet Creeper when tastefully arranged, for house or church decoration. It is particularly effective for draping mantels, and ample lengths should be cut for this purpose with the large red trumpets naturally disposed amid the foliage. Fire-places and corners may be filled with it, a background of *Asparagus* with red berries giving lightness of effect. Balustrades may be wreathed with it, and it may be draped in graceful festoons from the walls. Wild *Clematis*, wild *Grapevine* with ripe grape-clusters,

and the Virginia Creeper with its berries, are some other vines that can be often used with fine effect for decoration. One who searches through the shrubberies for material for this purpose finds many odd-looking carpels and capsules and berries, as well as hips and haws. Among a few of these are Elderberries with abundant foliage, which are suitable in some arrangements, and mingle well with yellow flowers, and the despised Golden Elder is not unattractive used in this manner. A branch of the rare *Fontanesia phyllæoides* was found attractive, its singular light green seed-vessels depending from the twigs in pleasing contrast with its neat foliage of a darker shade. The black seeds of *Pardanellus Chinensis* contrasted with their yellow stems and capsules, may be used effectively sometimes in arrangements of wild flowers. The burnished purplish berries of *Callicarpa purpurea* give variety to bouquets of wild Asters; and branches cut from bushes of *Rosa rugosa* may be used by themselves, the handsome little red and orange colored apples hanging effectively among the rich green foliage.

These few suggestions may be useful to supplement the admirable articles upon the subject of interior decoration that have already appeared in GARDEN AND FOREST.

Rose Brake, W. Va.

Danske Dandridge.

Notes from Germantown.

To the Editor of GARDEN AND FOREST :

Sir,—With reference to the Black Locust (see page 338), I have observed that the Locust borer is a pest of this tree and that the growing of it for profit is not always satisfactory. On a recent journey from Carlisle to Gettysburg I saw a large number of Black Locusts, and in many cases the borer had nearly destroyed them. In some instances the trees had been set out along farm lanes and dividing lines, and I observed some rows in which every tree was partly dead. Usually it was the upper half which was injured.

English Hollies do not utterly lack in hardiness if they are surrounded by other evergreen plants while young, and are being planted in this vicinity more than formerly. The Japanese species, *Ilex crenata*, is more hardy than English Holly and has small myrtle-like foliage. Of course, our native Holly is entirely hardy about Philadelphia.

The long loose clusters of fruit of the White Fringe-tree, *Chionanthus Virginica*, are ornamental now. The sterile flowers and the fruits are borne on separate individuals. Sterile plants are sometimes grafted with the fruit-bearing sort, but the grafts do not take readily. Those who have sterile plants may take satisfaction in knowing that the flowers on these are more beautiful than those of the fruitful plants.

The fruit-pods of *Euonymus Americanus* are showy now. The pods are purplish red and warty-looking. The resemblance of this fruit to that of the Strawberry tree of Europe, *Arbutus Unedo*, is not altogether a fancied one, and a few years ago tree-agents sold any sort of *Euonymus* for Strawberry trees. When quite ripe the fruit of *Arbutus Unedo* is excellent for eating. *E. radicans*, though mostly used as a vine or for an edging to a bed, is an attractive pyramidal object when tied to a stake for a year or two. These plants are sometimes used in cemetery lots, and when trained in this way they closely resemble a Juniper in form, and are also evergreen.

Althæas have not been as beautiful in many years as they are now, the frequent rains having suited them perfectly. These shrubs could hardly be spared at this season, both because of the number of pleasing varieties and the scarcity of other shrubs in flower at this time. The bushes should be severely pruned in their dormant season to bear the best flowers.

Our wild Bearberry, *Arctostaphylos Uva-ursi*, is not found in many collections. It needs a sandy soil and thrives well in almost pure sand.

Germantown, Pa.

Joseph Meehan.

Some Utah Shade-trees.

To the Editor of GARDEN AND FOREST :

Sir,—The deciduous trees planted in Utah for shade, either in the cities or on the farms, consist almost entirely of three kinds, the Lombardy Poplar, the Black Locust and the Box Elder, although the Carolina and Bolle Poplars are used to some extent and are gaining in popularity. The Lombardy Poplar is by far the most common and is planted, even by men who do not admire its characteristic appearance, because it seems especially adapted to the climate, grows very rapidly and will, therefore, soonest change the somewhat monotonous appear-

ance of most of the valley lands and supply the much-needed shade. It is also probable that its abundance at all the nurseries may have had some influence with those who take what is offered them in the way of trees, without much regard as to its desirability. But whatever the causes, the fact remains that all over the state, wherever trees will grow at all, rows of tall Lombardy Poplars are seen marking the boundaries of farms or the courses of irrigation ditches, a characteristic feature of every Utah landscape. As might be expected from their abundance, the cotton becomes a decided nuisance when it falls, especially in the cities; so much so that in most of the larger cities ordinances have been passed requiring the removal of all Poplars with pistillate flowers. The thrifty nurseryman, taking advantage of this, soon placed upon the market Poplar-trees which bore only staminate flowers, and as a proof of this pointed out to the intending purchaser rows of older Poplars from which the pistillate specimens had been carefully removed.

The Black Locust stands next to the Lombardy Poplar in point of numbers, but does not seem so well adapted to the climate. Borers invade it to some extent, and the older specimens soon present a rather ragged appearance from the large number of dead twigs upon them. Yet the trees will endure many hardships, and are, perhaps, better able to withstand drought than the Lombardy Poplar. I have seen some specimens about old ranch buildings and in similar situations which could at no time have received more moisture than is afforded by the scant rainfall of that region, and yet, although they were but little taller than the Sage Brush which surrounded them, they appeared to be perfectly healthy and had made a considerable growth in thickness.

One accustomed to the Box Elder as it grows through central United States would scarcely recognize the Utah specimens, so tall and straight do they grow. Many of them closely resemble the Soft Maple in general outline, and that is likely to be one's thought on seeing them for the first time in their winter condition. This change in appearance I should ascribe to the fact that the climate of Utah is singularly free from winds, with the exception of those from the cañons, and that the trees are usually planted along the streets of the towns, or if on the farms along the irrigation ditches. As in all Utah cities both sides of each street are provided with small streams of water, it will be seen that in either case the conditions are especially favorable for growth.

The grounds of the Mormon Temple at Salt Lake City are adorned by some very fine specimens of Ailanthus-trees, but their beauty has been greatly diminished by the ruthless manner in which the tops have been mutilated. Just what the object was in cutting back the tops it would be hard to say, for they are not unusually tall and do not obstruct the view of the temple. But they have twice been cut back, the first time evidently almost to straight poles, and the second time hardly less severely. This treatment has materially injured the appearance of the heads, but the boles are very handsome.

That most beautiful of all shade-trees, the American White Elm, is now being planted in considerable numbers in the cities, and is a great relief from the Locusts and Poplars so monotonously prevalent in the older plantings.

Tescot, Kansas.

F. C. Sears.

Recent Publications.

Circular No. 12, issued by the Division of Botany of the United States Department of Agriculture, describes the conditions of successful cultivation of the Camphor-tree, *Cinnamomum camphora*, and the uses of the tree and its products, and contains other interesting particulars. This broad-leaved evergreen is related to the Red Bay and to the Sassafras in the United States, and in general habit resembles the Basswood. In the coast countries of eastern Asia it attains a height of from sixty to one hundred feet and a trunk measurement of from twenty to forty inches in diameter. In Japan the law requires that a new tree be set out for every one cut. It is stated that the northern limits in the United States where this tree has been grown successfully out-of-doors are Charleston and Summerville, in South Carolina; Augusta, Georgia, and Oakland, California. In the southern cities named the trees have withstood a temperature of fifteen degrees, Fahrenheit, but they were protected by surrounding trees and buildings. At Mobile, Alabama, they have grown and fruited in protected situations, while in exposed places they have been repeatedly destroyed by frosts. They will grow in almost

any soil that is not too wet, but do best on a well-drained sandy or loamy soil, and respond to fertilizers. While of comparatively slow growth on sterile soil, the trees grow very rapidly under favorable conditions. An exceptional instance is recorded of a Camphor-tree in Italy which in eight years from the seed measured one foot in diameter and ninety feet in height. Trunks six to eight inches in diameter at the base and thirty feet in height may be expected in trees ten years from the seed under favorable conditions. Besides the familiar use of camphor-gum to protect furs and woollens against insects, this gum is used extensively in medicine. Camphor-oil, which is somewhat similar to turpentine, in Japan enters into lacquer-work, and it is also used in the manufacture of toilet soaps. The yellow wood is of close grain and is susceptible to polish, taking a satin-like finish; this is particularly valuable in cabinet-work, especially for drawers, chests and cupboards, being proof against insects. The tree produces an abundance of berry-like fruits, which in China and Japan are used to make a kind of tallow; these are also a favorite food of chickens and birds. Besides these commercial uses, the tree has value for ornamental planting, and has been extensively introduced into southern Europe and South America for this purpose. For successful cultivation the minimum temperature must not be lower than twenty degrees, Fahrenheit, and this interesting circular suggests that it is hoped by continued selection of seeds from the most hardy trees plants may be bred up to endure more cold. Camphor of good quality has been produced in Florida from the leaves and twigs of trees less than twenty years old, one pound of crude gum being obtained from seventy-seven pounds of leaves and twigs. One-third of the leaves and young shoots may be removed at one time without materially checking the growth of the tree. The older and larger roots yield the largest proportion of camphor; the trunk, limbs, twigs and leaves contain successively a decreasing proportion. Present methods of distillation are here described and improvements suggested.

Within the past ten years there has been an increase in importations of refined camphor in the United States and a decrease in importations of the crude product, notwithstanding the former is dutiable while the latter is admitted free. Improved methods of refining and packing in Japan and a reduced tariff rate account for this change. In 1887 there were imported 2,873,184 pounds of crude camphor, valued at \$352,861, and in 1896 but 943,205 pounds, valued at \$328,457. In 1887 only 307 pounds of refined camphor, valued at \$45, came into this country, while in 1896 153,912 pounds were admitted, worth \$68,785. These figures show that the price of the refined and the unrefined product has increased three-fold in this period, and that the consumption of camphor in this country, as measured by importations, has been decreasing. This decrease is attributed to exhaustion of the supply of available Camphor-trees near the shipping ports, governmental restrictions on the trade in camphor in Formosa and taxes on the exportation, hostilities and wanton destruction of camphor stills by the natives in Formosa, disturbances in the camphor-producing district of China, the China-Japan war, and attempts by speculators to corner the market. The increase in the price of camphor has led to the introduction of substitutes, and camphor has been manufactured artificially at a cost which leaves a margin of profit at present prices. The conclusion is that if the production of camphor from trees is to be carried on with profit in this country and the industry increased to any considerable extent, the price of camphor must be reduced to compete with the prices of substitutes now taking its place.

Notes.

Mr. R. A. Rolfe notes in *The Orchid Review* the discovery of a natural hybrid between *Orchis maculata* and *Habenaria bifolia*. This interesting addition to the British flora was

found on a moor six hundred feet above the sea-level, near Glenalmond, Perth. A hybrid between the same genera was found in France in 1891.

Florida papers state that photographs recently made for exhibition show twenty-eight pineapples, estimated to weigh about 400 pounds, growing on a plot of ground ten feet square, near Orlando, in that state.

The receipts of bananas at this port during the month of August amounted to 420,100 bunches, and exceeded the business of the same month in last year by 138,500 bunches.

In the Forestry Building at the Tennessee Centennial Exhibition forty-five different kinds of hard wood are shown as the product of a single farm in Montgomery County, Tennessee.

The peach crop of Missouri is immense this year, and a conservative estimate of the yield in five of the great fruit-growing counties in the south-western part of the state is 412,500 bushels. The output of a single farm of 1,600 acres in Oregon County this season is 15,000 bushels.

A Penn Yan correspondent of the *Fruit Trade Journal*, writing from the grape region about Lake Keuka, New York, reports the grape crop to be two weeks later than last year. There is promise of a two-thirds yield of Delawares and a large crop of Catawbas if the frost holds off, while Concords will not give the average yield.

The American Fruit-growers' Union will hold a convention in Nashville, Tenn., on September 8th to 10th. It is proposed during its sessions to form an association comprising the fruit and vegetable growers of the entire country, particularly southern growers. The entire north and west is dependent upon the extreme south for early vegetables up to May 15th.

One of the most famous trees in Connecticut is the so-called Poetry Oak which stands in front of the meeting-house at Pachaug. The agricultural papers of half a century ago commented upon its size, and a more recent writer says "it has heard fifty-two sermons a year for 177 years and political speeches from the settlement of the country down to the present day," and reports that its trunk is nearly twenty feet in circumference while the spread of its branches exceeds 240 feet.

The so-called Panama hats, beautifully woven and very expensive, come in large part from Central America. But about five million hats of a similar kind, although of different grades, are annually exported from Spain, where in the Andalusian district, they are manufactured from the leaves of a species of Palm which there grows almost wild. They are made entirely by hand, after the methods pursued for centuries, and the industry is said to support more than ten thousand persons, mainly women and children. The finest kinds can be made only by skilled operatives, who consume a week in producing two hats.

A new hybrid *Aristolochia*, probably the first of which there is record, is figured and described in a recent issue of *The Gardeners' Chronicle*. The parents, *A. Brasiliensis* and *A. elegans*, belong to two very distinct sections of the genus, and the upper lip of the hybrid is described as intermediate in shape between that feature in the parents, slightly crumpled, cream-colored, thickly bestrewn with arborescent purplish spots. The throat of the perianth is clear yellow, as in *A. elegans*, with numerous purplish radiating veins. This interesting and showy novelty is an acquisition to the stove climbers, and was originated by Mr. J. M. Bell, gardener to Rev. Canon Prettyman, Louth.

A bulletin on vegetables just published by the West Virginia Experiment Station reports that the same quantity of field beans planted in drills will produce twice as much as if planted in hills. Where but a few plants of Lima beans are grown for family use it is recommended to plant the seeds in inverted sods in a hot-bed, from April 1st to 10th, as the increase will more than repay the trouble. Bush Lima beans are compared favorably with the pole sorts and said to be worthy of taking their place. The saving of poles and training would, of course, be a clear gain. The bush sorts are said to require less space for development, so that a larger yield per acre may be counted upon, particularly toward the northern limit of the successful cultivation of the pole Limas. The limit of the successful cultivation of bush Limas is said to be much farther north than that of the pole Limas.

In 1895 four public playgrounds for children were opened by the Philadelphia Board of Education. Eight more were added in 1896, and ten additional ones this summer. The cost

of equipping the twenty-two which are thus doing service was only \$3,000, while the attendance at each averages from 300 to 600 persons a day, according to its situation in a more or less densely crowded quarter of the city. Of course, the majority of the frequenters of these playgrounds are children. But poor mothers often pass a part of the day within them, while others leave their children, including even babies in carriages, in the care of the janitor and teacher. Large sand-piles form the chief attraction, but in some grounds swings, seesaws, toys and games of various kinds are supplied, and as much shade as possible is always furnished.

Among eighteen papers included in the proceedings of the Society for the Promotion of Agricultural Science, at its annual meeting held in Detroit last month, were An Experience in Managing a Weed Garden, by Professor W. J. Beal; Notes on Bean and Pea Tubercles, by Professor B. D. Halsted; The Annual Growth of Forest Trees, by Professor W. R. Lazenby; Objects and Methods of Soil Analysis, by Professor E. W. Hilgard; The Promotion of Agricultural Science, by Professor I. P. Roberts, and Further Observations in Varieties of Timothy, by Professor A. D. Hopkins. Professor Halsted, of the New Jersey Experiment Station, was elected president for the coming year, and Professor C. S. Plumb, of Purdue University, was made secretary and treasurer. This society, founded in Boston nearly twenty years ago, has for its object the advancement of progressive agriculture. The membership list is increased only by invitation to scientific workers and is limited to one hundred. The next meeting will be held in Boston in August, 1898, in connection with the fiftieth anniversary of the American Association for the Advancement of Science.

Our native Squaw-root, or Cancer-root, *Conopholis Americana*, is illustrated and described in *Meehan's Monthly* for September. This singular and somewhat uncommon plant is best known in its mature condition, when the small clusters of blackened spikes resemble slender old Fir-cones. While widely distributed over the eastern and central portions of the United States, it is nowhere common, and about Philadelphia is stated to be the most rarely found in a list of rare plants. It is in bloom in that vicinity toward the close of April, though in a late season its curious flowers do not appear until the beginning of June. The parasitic tubers have a preference for the roots of Oaks, but individual plants and groups are sometimes supported by a few straggling roots which penetrate from three to six inches of peaty bank. The plant is elusive because it is often unable to pierce through the heavy crust of decayed leaves. The flowers, which develop and perfect themselves in four to six days, rarely, if ever, produce fruitful seed, and the plant perpetuates itself mainly from eyes in its thickened corm-like tuber. The resemblance to its near relation, the Beech-drops, also known as Cancer-root, *Epiphegus Virginiana*, is noted in several particulars.

In an editorial article recently published in the Boston *Transcript* it is stated that the action of New Hampshire toward the prevention of destructive tree-cutting is most closely watched. Not, perhaps, because the denudation is most pronounced there, but because from its attractiveness as a summer resort the losses to its forests are the more evident to the traveler. No one who traverses the wild road leading up to the Old Man of the Mountain can help bewailing the short-sighted policy that is denuding these hillsides and valleys. Here the woods are so deep and so extensive that deer may occasionally be seen crossing the public roads. But for five miles up the valley there is the sawdust trail of the woodcutter, who mows the forest from the mountain side and chokes the rivers with his refuse. And this is the condition of New Hampshire's choicest retreat, where as much land as possible has been retained by careful and intelligent owners, who realize that when the forests are gone New Hampshire's attractions for summer tourists will be gone also. Three-quarters of the cutting in New Hampshire is of that sweeping kind that leaves not even a sapling on the denuded area, but the Legislature has not yet given signs by its acts or its appropriations of serious intention to stop the waste. The present course cannot fail to rob the Granite State of its forests, and will make it impossible to replace them by other forests. The remedy will probably come in protests from persons interested in the summer resorts. When they realize that the income derived by the state from its visitors is quite equal to that derived from the cutting of lumber (and this was stated to be true a number of years ago), they will see to it that their interests are not imperilled further by reckless lumbering.

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The Improving of Native Plants.

HISTORIES are mostly unreliable, and the histories of our fruits and vegetables are no exception. Few can see the value of any occurrence at the time when it takes place, and it is only in after years, when the results are apparent, that we begin to look about for the attending circumstances. This truth is evident when reading the histories of our fruits and garden vegetables. We know that they were derived from wild forms still in existence, and that they reached their present conditions only after long and patient experiment and display of skill. The monks of old especially are credited with the expenditure of much study in bringing our garden vegetables to their present state of comparative perfection, and possibly to them we are indebted for much that is good in them. The fact is that there is no great amount of knowledge or skill required to produce these improvements from the wild stock. Perseverance in selecting individuals which vary somewhat from the usual forms, sowing seeds of these, and choosing plants which are nearest to our ideal, and following up this for a few generations, represent the knowledge and skill necessary. A few years of perseverance are required, and this the monasteries were in excellent condition to give. It is no wonder, however, that the uninitiated look on with awe at the change, and that polite history credits it to the great skill and knowledge of the improver. The Beet-plant may now be drawn from its native soil with its long thready root no thicker than a goose quill, and it seems incredible that this should be the parent of the Sugar Beet. So also the parent of the Cabbage may be gathered with a couple of leaves not as large as one's hand and a six-inch spike of yellow flowers, and yet from this unpromising origin came Cabbage, Kale and Cauliflower. And these improvements have been brought about by simple selection and resowings from some one aberrant plant.

It is somewhat surprising that no one has taken in hand the improvement of our native vegetables to any great extent. Certainly we have Corn, Beans, Tomatoes and a few other plants that are natives of our continent, but these we received from the natives before us. We, from the old world, have done nothing for the vegetables of the new world. We go to China for Chingì when our own species of Stachys and its near neighbor, Lycopus, have tubers

nearly as good. Our native Indians could tell of scores of roots that would be as good as many of our popular vegetables if taken in hand and selected for improvement as others have been.

In 1804–5–6 a wonderful event occurred in the successful crossing of this great continent for the first time, and the return to the “village” of St. Louis by Captains Lewis and Clark and forty-three companions. Among the instructions given them by President Jefferson was one to take notes of plants that might be serviceable to man. A collection of plants was made by them which has not been seen since the botanist Pursh's time until this summer, when it became my good fortune to find it in the vault of the American Philosophical Society in Philadelphia, Pennsylvania, where these specimens, with others, were deposited after Dr. Barton's death. Under the specimens are full notes of their uses by the Indians. These great explorers were not botanists except in the general way that intelligent persons of a few generations back were expected to have an outline knowledge of every school study. They knew, for instance, that certain plants belonged to the umbelliferous family, and others to the Lily family, and they went this far in their written descriptions. It is especially surprising to note the number of members of the Umbelliferae in use as food, and we still have in our gardens Celery, Carrot, Parsnip, Parsley and others; but because there happens to be one fatal Hemlock among them, the whole family is under suspicion. On one of the labels is written, “This umbelliferous plant is the only one whose root is not eaten by the Indians.” Unfortunately, during the three-quarters of a century that the specimens have been bundled up, the museum beetle has done effectual work, and not a scrap of the plant is left to which this label was attached. Another label tells us “The Indians use this root, boiled or raw. It has a fusiform root, not unlike our common carrot, and, indeed, the leaves are somewhat of the same character. They taste like sugar.” Surely such good material is worth investigation and study. These labels suggest that there is scarcely a starchy or succulent root but is good for food. Even our common Silver-weed or Goose Grass, Potentilla anserina, has a place in this useful list, and a label tells us that “we found them very pleasant when roasted, resembling in flavor somewhat a sweet potato.”

In the busy days of the modern American the few years of trial required to bring up American weeds to the rank of useful vegetables cannot be spared. But our agricultural colleges more than supply the place of ancient cloisters. With a wide knowledge of science, with skill in experimentation, the officers of our colleges and stations are much more completely equipped for this work than were the monks or any one else of their generation. At least, here are two fields in which they would have practically no rivals. In the first place there is a mass of bibliographical work of the past century which can be arranged for useful reference, so that we can preserve the gains our predecessors have already made. And again there are wild plants everywhere which by careful selection might be transformed into edible foods of the highest value. We do not refer, of course, by this to the nuts and berries exclusively, but to salad plants and garden plants for preparation in other ways that will add variety and value to our foods.

Germantown, Pa.

Thomas Meehan.

Wild Flowers of Early September.

WITH September the reign of the Golden-rod and the Aster is established, though it is not at once supreme. Some of the August flowers, and especially the tall late-summer “weeds,” are still prolific and lusty; and certain later comers help them to dispute the conquest of field and roadside with the two great autumnal genera.

The showiest of the Eupatoriums, the showiest of all August flowers—the Joe-Pye Weed—is past its best. Many

of its great pinkish-purple bouquets still sway in the wind, sometimes at twice the height of a man, but for the most part they are now faded and dry. The white Boneset, however, still flourishes; and the most beautiful member of this genus has just reached its best. August does not show the White Snakeroot, *Eupatorium ageratoides*, as early September shows it. And it is not merely a chief ornament of these particular days. It is one of the most beautiful of the Compositæ, and no more charming flowering plant of an analogous kind grows in any garden. Through the fence, from the woodland border, in the meadow thickets, it spreads its polished dark red branching stems, bearing their numerous corymbs of blossom. Its flowers are larger, more brightly white, and less hairy-looking than those of the other *Eupatoriums*, and Nature has done so well with this plant that the gardener would not need to "improve" it to fit it for frequent use in the pleasure-ground. Indoors it looks best when arranged by itself, for its own stems and leaves and flowers furnish contrast enough, and none of their charm ought to be hidden. It is appropriate for small bouquets for mantel or table decoration, as well as for large arrangements, simulating its effect as it grows. But in neither case should it be too closely massed. Its graceful habit and the color of its branches should always be revealed.

The most conspicuous plant which is now in its prime is the many-branched form of the Button Snakeroot, also called the Blazing Star, although it is hard to see why, for its heads are not star-shaped and their color is a deep red-purple. When it grows under favorable conditions where it has plenty of moisture, the rich-hued "buttons" of *Liatris scariosa* are remarkably numerous, and are well set off by the very dark green of its abundant foliage. It is not one of the more graceful Compositæ, but it is stately and handsome. It may be massed in house decoration because Nature grows it in masses. And its dark tones may well be relieved, as Nature often relieves them, by the admixture of a few sprays of Golden-rod. But it should never be combined with *Asters*. Their more delicate habit unfits them for its companionship, while when their blossoms are blue or lilac they do not harmonize with its redder purple.

The most popular flower of this season is undoubtedly the red *Lobelia*. The most careless eye cannot ignore the Cardinal-flower as its graceful spike flames against the dark hollow above a shadowed pool or springs from a brookside tangle. The village child delights to discover it, and the most captious taste need ask nothing more beautiful than its distinctive form and dark velvety red color—the most beautiful red, in tone and in texture, which any of our wild flowers can show. Nevertheless, when the Cardinal-flower is brought home and put in water its effect is usually a disappointment. This is because it is most often arranged in bunches with only a slight admixture of green. Its color then survives; but the effect, as of a lance-like flame, which was so enchanting in Nature, has disappeared. If a bowl is filled with foliage and then a few tall spikes of the Cardinal-flower are set in it one by one so that the individuality of each is preserved, a much better result will be attained. And the foliage ought to be of the darker greens, like the leaves of the plant itself. So deep a red as that of this *Lobelia* does not contrast well with yellowish greens.

Admirable, too, is the Great *Lobelia*, *L. syphilitica*, with its flowers of an intense blue, rivaled only by the blue of the *Gentians*. It has not the grace of *L. cardinalis*, nor its vivid effectiveness, but is a desirable addition to the resources of the decorator of the house at this particular season. It will be forgotten when the *Gentians* come, but as yet only one of these is available. This is the Closed *Gentian*, *G. Andrewsii*. Delightful in color, it is stately and decorative in habit, and is well worth seeking, for it lasts longer after cutting than almost any other flower of the season. Nothing else should be combined with it. Its strong stems should lift their fine whorls of dark green

leaves and their clusters of oval blossoms, deep blue streaked with white, from the glass or vase undisturbed by contrast with any plant of another habit and color.

The various Compositæ of the genus *Prenanthes* (the Rattlesnake-roots) now add variety to the roadside and forest border. The tall, slender stems and slim panicles of nodding heads which some species produce have an attraction peculiar to themselves, and much of it may be preserved when they are brought indoors if Nature's methods of arrangement are again observed. The flower-stalks should be kept of their full length, or nearly so, only two or three of them should be used, and they should be allowed to rise well above the general level of the contents of the vessel in which they are placed.

The Swamp Loosestrife, *Decodon verticillatus*, is not yet out of bloom, and the light pink of its delicate blossoms makes it peculiarly attractive at a season when purples and yellows so largely carpet the earth. This plant, sending out near the ground long recurved stems covered with whorled leaves and axillary clusters of flowers, should not be arranged in the house to simulate the aspect of erect-growing plants. A number of its stems should be placed in a low flat vessel, curving outward from it in all directions, and this vessel should be set on the floor so that the eye may look down upon it as it does upon the plant itself when it grows in the wet ground by the pondside.

Every one who loves plants must long ago have discovered for herself the best ways in which to make use of the Golden-rods and *Asters*. And the many berries which are available at this season are not difficult to manage. Common sense decrees that they should be shown with their accompanying leaves as they grow on the branches. But there is one plant, the White Baneberry, the fruit of which is conspicuous just now, which teaches an interesting lesson in regard to natural beauty. This is the lesson that if any of Nature's products seems ugly, it is because it is taken out of its right environment. Even a snake is beautiful as we catch a glimpse of it gracefully gliding among thick foliage. Even a bullfrog is very handsome as he sits on a half-submerged log, half-submerged himself. And even the flower which is least attractive when put in a vase or held in the hand and examined, has its own peculiar charm when seen, or half-seen, amid its natural surroundings. This lesson is strikingly enforced by the fruit of the White Baneberry. When examined it is distinctly ugly. The white berries, each perched on the end of a thick stiff red stalk, and these stalks set stiffly at wide intervals around the stem, look as though, not the skillful hand of Nature, but the prentice hand of some human workman had both shaped and colored them. The spike looks as though it had been manufactured, not grown, and manufactured with dead wood and paint, not with vital vegetable tissues. Yet a spike of White Baneberry as it grows in the roadside tangle, revealing itself as shining sparks of white and lines of crimson, is a very delightful object. It is wisest to admire it and pass it by. No good effect can be produced with it if it is picked and brought home. And much the same may be said of the thick scarlet spadix of the Jack-in-the-pulpit.

By the seashore many delightful plants which are not named here may be found in early September. But even amid the less varied flora of the hills there is one which must not be forgotten. It is very lovely in itself, and it is all the more attractive because strength and showiness, not extreme delicacy and fragility, are the qualities we look for in the plants which blossom at this season. No vernal plant exceeds the Slender *Gerardia*, *G. tenuifolia*, in the qualities which its names denote. Some of its larger yellow-flowered brethren still show their blossoms, although their real season is August. But only an examination of the fashion of their flowers could suggest that they are indeed its brethren. It is impossible to describe the delicacy, the fragile, airy grace, of this little species with its tiny almost thread-like leaves, its rosy purple flowers, and its paler, almost white, globular flower-buds. The red and

yellow Columbine of spring seems almost sturdy if we think of it in comparison, and even the Harebell is not so frail. On woodland banks or open meadows it is exquisite indeed, and if rightly treated indoors it preserves its charm. Nothing else should be mixed with it, but if a loose bouquet of it is put in a thin white glass vase, the beauty of the open flowers and the spark-like effect of the unopened ones will delight the eye for a few brief hours. On the morrow it will have withered. But who would expect a flower like this to "last" as does a Golden-rod or a Closed Gentian? The only marvel is how its fairy-like frame can furnish sap enough for the elaboration of its lovely flowers.

Tuxedo Park, N. Y.

M. G. Van Rensselaer.

Some Facts about Frost Prevention.

IN few countries have methods for the prevention of injury by frost been so systematized as in France. The nature of many of the crops and the peculiar situations they often occupy have demanded extreme vigilance at critical periods or total loss has followed. Prior to the comprehension of the principles involved in these methods, and even at the present day in less enlightened communities, the disturbing cause of frosts has been that arch-enemy of agricultural practice, the moon. This innocent luminary has, in the past, exercised as baneful an influence over the fruit crops of France as it does in certain benighted Potato-fields in America at the present day. It was not until long after the physicist Arago had explained the cause of these late spring and early autumn frosts that the superstitious peasantry gradually lost faith in the blighting efficacy of moonbeams. These frosts, Arago demonstrated, are due to the rapid radiation of heat from the earth, always augmented by still air and a clear sky, but retarded by clouds and wind, the former acting as a blanket to check the escaping heat, the latter preventing the air from settling in pocket-like formations in the general contour of the land.

Coverings of paper and other materials commonly used to protect flower-beds would in themselves be too slight a protection but for the check they give to the heat and moisture escaping from the ground. The relatively high temperature maintained under these coverings is due to the continual evolution of heat which accompanies the condensation of moisture. To protect small areas or a limited number of specimens, French gardeners use straw mattings, bell-jars, various kinds of frames and screens, which latter are, as at Montreuil (in the vicinity of Paris), hooked to permanent or temporary supports. This last method was brought to France, by way of England, from Scandinavia, where it has been used time out of mind for the protection of wall fruits.

A unique method for tree protection is the hanging of a thick rope from a high branch of the tree, the lower end being in a pail of water. *The Farmers' and Planters' Encyclopædia* remarks that "should a slight frost take place at night it will not in the smallest degree affect the tree, while the surface of the pail, which receives the rope, will be covered with ice; the water placed in another pail by the side of it, by way of experiment, may not from the slightness of the frost, have any ice on it at all." In this case the rope, by exposing a large surface to the air, aids the evaporation of the water carried up by capillarity, and the heat evolved by the condensation of this water among the foliage raises the temperature above the line of danger.

When plants are covered by hoar frost they may yet be saved, say Decaisne and Naudin (*Manual de l'Amateur des Jardins*, vol. i., page 624), by sprinkling them freely with water, which loosens and removes the ice and gradually raises the temperature of the plant to its normal degree of heat. Doubtless this is a somewhat sweeping assertion, since the damage may have occurred at the time of freezing. And damage at the time of freezing seems all the more probable from the following experiment recorded by Stewart. Two sets of smudges were placed in different

vineyards equally exposed. In the first, they were lighted one hour before sunrise; in the second, when the temperature reached the freezing-point. In the former the buds were frost-bitten; in the latter, unhurt. Some plants can stand a good deal of frost without being injured, while others are permanently disabled by temperatures not below the freezing-point.

The practice of smudging is more ancient than is usually supposed. De Serre, a prominent agriculturist of the sixteenth century, recommended it, and it is even said to have been favorably spoken of by Pliny. In Wurtemberg, in 1796, the men were divided into companies of about twenty, under a captain, to protect certain assigned districts, and were called out by an alarm given by a regular watchman. This service was compulsory, since article seven of the rules reads that whoever "shall refuse to obey, shall be prosecuted before the bailewick, and receive exemplary punishment."

Even long after the practicability of frost prevention had been demonstrated, fruit-growers, instead of testing the methods, as a rule continued to accept its ravages as a thing to be expected, but not avoided. But of late years they have commenced to see the benefits derived, and the use of smudges has been growing in popularity. These are made of almost any substance, such as dampened straw, manure, tar, sawdust, crude kerosene; in fact, anything which will produce a smouldering fire with much smoke and little blaze. Besides these substances, various compositions have been put upon the French and other markets. One of these, Lestout's (considered the best), is sold in the form of bricks, which weigh sixteen pounds, and cost about fifteen cents each. They are placed about thirty feet apart, and lighted at the approach of danger. A tract of about 2,200 acres may be protected by 300 of these bricks at a cost of about one cent per acre per hour for the material. The smudge formed will, in still weather, be effective for about two hours, when it may be renewed if necessary. In many orchards and vineyards these smudges are fired automatically by various devices. These are not often satisfactory, since the machine lights all fires at once, in which case, if there be but a slight breeze, the smoke from the leeward smudges is lost, while that from the windward fires is liable to be too much diluted with air to be effective.

A district rather than an isolated plantation should be protected. This is best accomplished by organized effort on the part of all proprietors owning crops liable to injury. One such company of 115 growers was formed at Moulis, in Medoc. Their operations were very successful. The cost of protection was only twenty-five cents a thousand vines for the season, a figure which could not be reached by individual protection.

The success attending the application of protective methods may be still further seen in the following cases: At Lussac, in Medoc, on April 21st, 1887, the trellis wires were covered with ice. Smudges were lighted at two A. M., and not only were the crop and the vines saved, but even the tenderest foliage covered by the cloud was uninjured. At Cornell University, in the autumn of 1896, the whole of the Dahlia and Canna plantations, which were in a hollow from which the cold air could not escape, were successfully protected by the smudge and water methods. At the Michigan Agricultural College, a few years ago, beds of Geranium and Coleus were saved by the water method, and were in fine condition some weeks after even less exposed beds had succumbed.

This water method consists simply in a liberal drenching of the plants and the ground on the evening when frost is expected. If there be a rise of ground in the immediate vicinity of the plants to be protected, it should also be wetted down so that the air which flows over it toward the plants will be saturated with moisture. When the temperature falls, water vapor is condensed, a large amount of latent heat is evolved and the temperature of the air is raised. Of course, when general freezes overspread a wide

area of country, nothing can be done to prevent injury, but when the fall of temperature is slight, either the smudge or the water method, or both together, will prevent injury, which would almost certainly occur if nothing were done.

Department of Agriculture, Washington, D. C.

M. G. Kains.

Foreign Correspondence.

Grammatophyllum speciosum.

SIR TREVOR LAWRENCE exhibited a full-sized spike of flowers of this, the largest of all known Orchids, at the last meeting of the Royal Horticultural Society. It was, of course, awarded a first-class certificate, and to this was added a gold medal for the cultivator, Mr. White, under whose skillful management the rich collection of Orchids at Burford Lodge has been for the last ten years. From time to time attention has been called to this giant among Orchids either by travelers who have seen it in all its glory in Malasia, where it is a native, or by collectors who have sent home big specimens of it in the hope that its magnificence might be seen here. But, although it has, as a rule, grown freely, it has failed to flower, except in rare instances. The Burford Lodge plant has been in the collection at least ten years, and has only flowered now, and that, too, after a course of treatment which, from its effects on the stems and leaves, might be termed drastic, but in that it has brought about the desired result it has proved to be so far correct. The Kew specimen of this *Grammatophyllum* is about four times as large as that at Burford Lodge, and it is in the best of health, some of the pseudo-bulbs being ten feet long, as thick as a man's wrist and clothed with leaves from base to tip, but it has not yet flowered. The spike produced by Sir Trevor Lawrence's plant was seven feet high, as thick as a man's thumb, and it bore thirty expanded flowers of a yellow and purple-brown color, each five inches across; the pedicels were four inches long, rigid and of a whitish green color. There were about thirty unexpanded buds at the apex of the spike. A peculiar character in this and several other genera is the production of two or three abnormal (male) flowers at the base of the scape, in which the segments are reduced to four and the lip is suppressed.

Large, however, as is the specimen of this Orchid to be seen at Kew, it is a mere pigmy when compared with the dimensions given of examples seen wild and in gardens in the tropics. For instance, in 1892 Mr. James Veitch saw in the Botanic Gardens at Penang a single specimen which measured forty-two feet in circumference and bore thirty spikes of flowers. In the following year, according to Mr. Curtis, the Superintendent of the Penang gardens, the same plant produced twenty-four spikes, each seven feet or more long, and bearing fully one thousand expanded flowers. It was, he says, growing on a mound three to four feet high, where it got the full sun all day after about nine in the morning. Once or twice a year half a cart-load of leaf-mold was scattered among the roots, and this was the only attention it received. The finest plants found growing wild in Penang are usually high up in the forks of large trees, where they get abundance of sunlight. The Kew plant was imported from Penang in 1893 by Messrs. F. Sander & Co., who intended it for the Chicago Exhibition, but it got too much damaged in transit to be worth sending.

The history of this Orchid is given as follows in Veitch's *Manual of Orchidaceous Plants*: "This gigantic Orchid excited the wonder of travelers in Malasia long before it found its way into British gardens. The physician Rumphius was probably the first European scientist who became acquainted with it, and through him, or through Osbeck, who visited the Malay Archipelago about the middle of the last century, it became known to Linnæus and to his successor, Oloff Swartz. Many years afterward it was detected by Finlayson in Cochinchina, and by the French botanist Gaudichaud in the Moluccas. . . . But it was not

till Blume published a colored plate of it in *Rumphia*, nearly a quarter of a century later, that the true character of the plant became known, and the surprise of botanists and the longing of horticulturists were awakened. It was first flowered imperfectly by Loddiges in the Hackney nursery in 1852; again in 1859 in a private collection in Surrey, and from this the fine picture published in *The Botanical Magazine*, t. 5157, was made. This plant had stems from nine to ten feet long and a scape six feet high with flowers nearly six inches across and of a rich yellow color, heavily blotched and spotted with red-purple. A plant flowered some years later in the collection of Sir G. Staunton at Leigh Park, from which a fine drawing was prepared by Fitch and published in 1876 in *The Gardeners' Chronicle*, and this drawing is repeated in this week's issue, together with drawings of the abnormal or male flowers prepared from Sir Trevor Lawrence's plant.

From my knowledge of this Orchid I should say that in the United States, where sunshine is more abundant and intense, the flowering of it would be easy of accomplishment. It likes plenty of moisture, both at the root and overhead, and it soon fills a bed of fibrous peat with a doormat-like mass of roots. It is in every sense a grand plant for a large tropical stove.

MARLIAC'S NYMPHÆAS.—The best of the hybrid and seedling Nymphæas raised by the French nurseryman, Monsieur Latour-Marliac, are of quite sensational beauty and interest. There is a collection of them at Kew, comprising all the best of those so far distributed by the raiser, and they have won universal admiration even from cultivators well acquainted with the older Nymphæas. The new sorts are just the plants for small aquaria, or even for cultivation in casks, as they do not grow rampantly as do those of *N. alba*, *N. tuberosa* and others of that ilk, but from a usually solitary crown spring a loose rosette of leaves and set in the midst of them, jewel-like, one, two, three, or even six flowers of varying size and shade, according to age, but all beautiful, richly so, in color as in form. They are expensive, it is true, as Nymphæa prices go, but they are worth all they cost.

FICUS RADICANS VARIEGATA.—This is a pretty little creeper which has been introduced by Mr. W. Bull, of Kings Road, Chelsea, who exhibited plants of it at the Temple Show last May, and again at the last meeting of the Royal Horticultural Society, by whom it was awarded a first-class certificate. It grows as freely and is as clean-looking as the type, while in the cream-white variegation of the leaves, which are oftener more white than green, we have a character that is likely to make the plant exceptionally valuable for clothing walls, pillars, rockeries, etc., in warm houses. According to the most recent monograph of the genus *Ficus*, *F. radicans* is a native of India and Malaya and its correct name is *F. rostrata*.

London.

W. Watson.

New or Little-known Plants.

Hydrangea paniculata.

UNDER the general name of *Hydrangea paniculata* there are four distinct plants in our gardens:

(1) A plant known as *Hydrangea paniculata grandiflora*, with enormous panicles of sterile flowers which open late in August or early in September, and now one of the most commonly cultivated shrubs in the northern and middle states.

(2) A plant which appears to be the wild form of the last with much smaller panicles appearing at the same time, only a few sterile flowers being scattered among the fertile flowers.

(3) A plant intermediate between these two and flowering at the same time, the panicle being nearly as large as that of No. 1, and more showy than that of No. 2 by the presence of a larger number of larger sterile flowers. This as a garden plant is, perhaps, the most desirable of the whole group.

(4) A plant similar to No. 2, from which it differs only in its time of flowering, which is during the first half of July, or about six weeks earlier. A flowering branch of this form appears in the illustration below.

tainous regions of Japan, and where it becomes a tree twenty-five or thirty feet in height, with a short well-formed trunk a few inches in diameter and stout pendulous branches.



Fig. 47.—*Hydrangea paniculata*.—See page 362.

It is from a plant raised in the Arnold Arboretum from seeds gathered in 1892 by Professor Sargent in the forests of central Yezo, where *Hydrangea paniculata* is exceedingly common, as it is further south in all moun-

Whether two species can be distinguished in this group, or whether we have only an early and a late flowering race of one species, we have not yet sufficient information on which to base an opinion.

Cultural Department.

Colchicums.

COLCHICUMS have a curious habit of pushing rapidly up from the bare earth and expanding their glowing flowers without a hint of foliage. However often seen these flowers are a surprise each season, as they give no token of their coming. While they are interesting plants in the garden, filled though it may be at this time with the tall and brilliant flowers of the season, their best effect is had from clumps planted in the meadows or on the borders of grass lands. For the wild garden they are invaluable and very effective. They maintain themselves and increase fairly in rather light, moist soil. As the bulbs are dormant only in June, July and August they should be moved at that time. The color effect is their principal value in such places, and *C. speciosum*, the bright reddish purple species from Asia Minor, is best for such plantings, especially as it is plentiful. For the more contracted garden one may indulge in some of the other species whose beauties bear closer examination. One of the handsomest is *C. Sibthorpii*, a large-flowered form which has glowing reddish purple flowers with some trace of white on the inside of petals, checkered with red. This is a free-flowering species, and, perhaps, the most attractive of the family.

Another species will soon appear, *Colchicum Parkinsoni*, a small-flowered Grecian form with purple bars and checkerings in a white ground. This species has not done well in my borders.

Much later than these and flowering late in October usually, is the white form of *Colchicum autumnale*. A double form of this species which has flowered regularly here for some years has a distinct flower with many narrow strap-like petals. It generally has a rather hard time of it, owing to the usual inclemency of the weather, but might appeal less to one's sympathies if grown under a mat of foliage or in some thin grass. There are about two dozen species of *Colchicum*, some of which flower in the spring-time.

Colchicum bulbs contain a virulent poison, but have been a favorite prescription for rheumatism for untold generations. I do not know whether they are a remedy or a tradition.

Elizabeth, N. J.

J. N. Gerard.

Notes on Gladioli.

THE flowering season of *Gladioli* is nearly past for this year, with the exception of young seedlings and bulbs planted late for the production of late blooms. The season has been, in this part of the country at least, much better than in 1896, both as to the quality of the flowers and the general vigor of the plants.

It is sometimes said that the *Gladiolus* has reached as high a degree of excellence as can be attained, but those who by raising seedlings and in other ways keep themselves informed will not agree that such is the case. There is a constant increase in the length of the spikes and the size of the blossoms, and we now look upon the varieties of even five years ago as inferior and hardly worth cultivating.

Speaking for myself, I notice year by year an improvement in the substance of the flowers, so that often the fifteenth and sometimes the twentieth flower expands while the first is still in good condition. That the colors improve I am not prepared to say; we have not yet a single good yellow hybrid of any shade, from straw-color to orange, and until we have good ones of every shade there is still work for the admirers of this noble flower. No doubt some will dispute the statement I have just made, but to my mind no yellow flower which is streaked with purple, as they all are, can be called good. There is no *Gladiolus* yet of the very dark shade found in *Africaine* and *Victory* which will withstand the sun as well as the lighter sorts; here is another thing to try for. The blue *Gladiolus* is yet to be raised. Monsieur Lemoine has given us several beautiful and striking varieties which he modestly calls bluish, not blue. These are very fine under some conditions, but they are all Lemoinei varieties of the sparsely flowering section and a dash of rain reduces the flowers to a miserable state.

Of the different classes of *Gladiolus* I value the *Gandavensis* most highly. This strain has finer spikes and more varied colors than any other, as might be expected from the much longer time it has been in cultivation. The Lemoinei race, descended from *G. purpureo-auratus* crossed with *Gandavensis* varieties, seems to divide itself into two sections, much unlike each other, one having tall arching stems with few flowers, and those of the hooded shape peculiar to *G.*

purpureo-auratus, and with usually very vivid blotches on the lower petals; the other with flowers as open as the *Gandavensis* sorts, and in many cases not to be distinguished as of the Lemoinei strain, except by the slenderness or the curvature of the stalk, yet this section has a few kinds with straight, erect spikes of flowers almost equal to any *Gandavensis*, yet plainly showing their hybrid origin. The Nancianus class, raised between *G. Saundersi* and the Lemoinei varieties, is remarkable for the size and striking appearance of its flowers, but there is not enough variety in their hues and too few are open at once. As for the Childsi class (I call it so with reluctance), which has been raised from *G. Saundersi* and the *Gandavensis* class, I am compelled to say of it, as I have said before, it must be much improved before it will be worthy of cultivation. There are, it is true, a few very good kinds which were worth naming. I have three such, but the bulk of them are in no respect better than eighty per cent. of the seedlings which we raise by the thousand. There must be a great self-denial on the part of those who raise seedlings of this strain, or it will fall into the obscurity which has swallowed up that California strain of which we had such glowing accounts a few years ago. When I expressed a similar judgment as to the Childsi class last year I received some letters of remonstrance, but I must speak of them as I find them, fully convinced that they may be made a distinct and valuable class, but only by using great caution in dignifying the seedlings with names.

I mark such of my seedlings as seem worthy of farther trial by tying a label to the stalk pretty tightly, and I find that these stalks give me more seed than others. Has any one noticed the same occurrence? I have before mentioned that *Gladiolus Saundersi* is hardy here. The clump which has endured several years is now again in full flower, a dense tuft of foliage with nine flower-spikes three feet long pushing boldly up from the turf, and giving me more pleasure than the thousands which I labor over so much.

Canton, Mass.

W. E. Endicott.

A New Double Hollyhock.

A GENERATION ago the single Hollyhock, *Althæa rosea*, was one of the commonest cultivated flowers, and its rose-colored blossoms were the most conspicuous decoration of many country dooryards. But the large plain flower, bold and stately though it was, failed after a time to satisfy the public taste. The ravages of the Hollyhock rust in Great Britain have prevented its being extensively grown there since the middle of this century. However, the dissemination of the more attractive double varieties in this country and the hope in England that the fungus pest has done its worst and can now be successfully combated, has reawakened interest in this old-time favorite.

The Hollyhock lends itself readily to the production of new varieties, and a large number are offered. There are now growing on the grounds of the Vermont Experiment Station, and were exhibited at the Vermont State Fair this fall, specimens of a new double variety originated by Mr. A. E. Wohlert, gardener to the Pennsylvania Railroad at Altoona, Pennsylvania. Several years ago Mr. Wohlert was in need of a flower for planting among shrubs which should make a good effect at a distance for a long period and yet look well near at hand. The common Hollyhocks were tried, and fulfilled the first requirement, but the blossom was too precise and geometrical when closely examined. Mr. Wohlert commenced breeding for a better style of flower by crossing selected specimens of a common single variety with *Chater's Best* and obtained a fringed, well-formed, semi-double flower. A seed sport from this was crossed with a large semi-double variety found growing in a farmer's dooryard, and produced a fine double strain, which Mr. Wohlert has introduced this year as the Alleghany Hollyhock.

The inner petals of the common double Hollyhocks make a compact mass of plain floral leaves all of the same length, but shorter than the true petals, which form only one whorl, as in the single varieties. On account of this arrangement and peculiar difference in the lengths of the petals there is produced an impression of disproportion between the heavy-appearing centre and the delicate wall. In this double Hollyhock the suggestion of formality and disproportion is absent, and the effect is more unconventional. For this reason it is more desirable for planting among shrubs. The reverted stamens are curled and fringed and not closely laid together. In the type they are of the same length as the petals, forming a large, full, well-rounded flower, light and graceful. The colors range through all gradations from pink to black-red.

The Alleghany is variable, and has already developed within

itself several different shapes. This marked variability is, of course, due in great measure to its newness, and persistent selection will do much to fix the variety. The most perfect flowers bear very few seeds, although those less perfectly doubled produce an abundance, and the strain would, therefore, be liable to deteriorate rapidly in the hands of inexperienced growers. This new form further shows a tendency each year to produce a few (ten per cent. or less) of single flowers and as many more of otherwise worthless ones. On account of its novel shape the Alleghany is a distinct and valuable addition to our already long list of Hollyhocks, while in delicacy of shades and tints it is surpassed by none.

University of Vermont.

V. A. Clark.

Notes from Wellesley.

AMONG autumn flowers *Rudbeckia fulgida* shows up well in the borders. It is tall and stiff in habit and floriferous. The flowers, though smaller than those of our native *R. hirta*, are distinctly rayed, while the black centre makes a striking and pleasing contrast. It is a useful plant for cut flowers.

Salvia splendens compacta can only be kept true when raised from cuttings. The plants are now a mass of brilliant scarlet. Growing not more than one foot high, these *Salvias* make a better bedding plant than scarlet *Geraniums*.

An attractive bed in the flower garden on the estate of H. H. Hunnewell, Esq., is made up of trailing *Roses* of the *Wichuraiana* type, with the pretty *Nierembergia frutescens* intermixed. The *Roses* are beautiful in spring, and *Nierembergia* makes a display in summer.

A bed of Giant Grasses, with *Arundo Donax* fifteen feet high, tapered down with striped and barred *Eulalias*, some *Panicums*, and here and there a *Cyperus antiquorum*, is one of the most attractive features here just now.

Cyperus alternifolius and its variegated form make excellent pot-plants for table decorations. They sow themselves freely in our greenhouses and come up as an edging to the walks. They are equally effective as bedding plants in sub-tropical gardens.

Another common yet interesting plant is the Wandering Jew *Saxifrage*, *S. sarmentosa*. It is not hardy. It makes an excellent basket-plant, the stolons, with plantlets, drooping sometimes more than two feet. Under the greenhouse benches it takes care of itself, and when in bloom is quite effective with long spikes of white flowers.

The vigor of the popular autumn-flowering climber, *Clematis paniculata*, is now well known; it here grows twenty-five feet and covers a large Maltese cross with a mass of bloom. Seeds gathered when ripe, sown at once in boxes, left until frozen, and then covered with litter and kept so all winter, will germinate in spring.

Wellesley, Mass.

T. D. Hatfield.

Rudbeckia Golden Glow.

WE have been much pleased with this novelty this season (see *GARDEN AND FOREST*, vol. x., p. 294), and consider it altogether the finest herbaceous plant for border use sent out in recent years. It is quite distinct from *Helianthus multiflorus* in that it flowers fully a month earlier and is past when the latter begins. The long-stemmed flowers are useful for cutting, and are smooth-stemmed and not so unpleasant to handle as those of the *Helianthus*. It is also perfectly hardy, a strong point in its favor, as the *Helianthus multiflorus* cannot be relied upon every year and often winter-kills, so that it needs protection to make sure of it. The variety *Golden Glow* appears to be a form of *Rudbeckia laciniata*, a rather weedy plant and suitable only for semi-wild situations. This double form is free from the objectionable weediness and its only fault is in the weakness of its stems, which it is necessary to stake when the flower-buds begin to form. Otherwise it is an ideal plant for the border.

South Lancaster, Mass.

E. O. Orpet.

Lilium Henryi.—It is a surprise as well as a pleasure to note the praise that has been bestowed upon *Lilium Henryi* in recent garden literature. After having seen it in blossom for two years in Mr. Horsford's gardens at Charlotte, Vermont, I am willing to believe all the good reports of it. The plant seems to be remarkably hardy, thrifty, vigorous and free from disease. The individual flowers are beautiful, but the general effect of several plants growing together is truly magnificent. There is a free and easy unconventionality about such a group which reminds one of *L. speciosum rubrum* at its best. *L. Henryi* is more pleasing, and it is, perhaps, not too much to

say that for the hardy border, thrift and beauty considered, this species surpasses all others known to cultivation.

University of Vermont.

F. A. Waugh.

Correspondence.

The Botanic Garden of the Michigan Agricultural College.

To the Editor of *GARDEN AND FOREST*:

Sir,—Michigan Agricultural College has a campus of about eighty acres, besides the orchards, fields, vegetable gardens and forests, and three acres are devoted to growing hardy plants in what is called a botanic garden. Here 1,850 species are now under cultivation. The botanic garden is well kept, and that it is interesting is attested by the many visitors of all classes during the growing season. Granges, farmers' clubs, Sunday schools, lodges, entire schools with their teachers, professors of colleges, and students taking a vacation trip on bicycles, all visit this botanic garden. It is none the less interesting, because it differs so much from the parks usually found in cities, and contains no "bedding plants." The interest shown by visitors encourages us to believe that the effort to plant and maintain a small botanic garden is worth a good deal more than it costs.

Everything considered, from early spring into late autumn, the Mint family is one of the most satisfactory to cultivate and one of the most attractive to visitors. Nearly all the species of Mints in our garden, some sixty-five in number, are placed in one group. Large dense masses of plants, with tops of an even height, are pleasing to most persons. The shape of leaf and the color sometimes attract attention, but the general shape of the plant strikes people as important. Of this family we have *Linden-leaved Sage*, *Salvia tiliaefolia*, an annual from Europe. The mass is dense and even, and three feet or more high. It always wins notice, notwithstanding the flowers are small and inconspicuous. Another low annual known as *American Pennyroyal*, *Hedeoma pulegioides*, is interesting when well grown. It is easily kept from year to year on sandy land, not too dry, and a patch three to four feet in diameter is satisfying to the eye. The odor is remarkable and usually pleasing. A dense and thrifty patch of *Thyme*, five feet across at this season, attracts insects in large numbers by its spikes of small light pink flowers and its delightful fragrance. In 1893, while attending the World's Fair, I made the acquaintance of an attractive plant on the prairies and took specimens of it to plant in the garden here. It is thrifty from spring to October, and it deserves more general cultivation than it has yet received. This plant is *False Dragon-head*, *Physostegia Virginiana*, one of the Mints. I planted it in sandy land, not far down to water. The leaves are thick, very dark green, lanceolate, strongly denticulate; the plants five to six feet high. To be appreciated there should be a good clump of it, and not only a few stems. In central Michigan it flowers late in August and early in September. The dense spikes are three to eight inches long; the flowers all bend to one side, are of a light rosy hue, an inch long and somewhat trumpet-shaped. The spikes are liable to fall over unless grown in a still place or tied to stakes.

In rich, moist black earth at the foot of a low bank under the spreading limbs of evergreen trees, we have a spot well adapted to Ferns and some other choice plants. Near by a group of *Ginseng* develops to perfection, and just now the umbels of shiny vermilion berries are at their best, and the leaves are beginning to show a tint of the same color. *White Baneberry* is displaying fruit to good advantage, the white berries on thick red pedicels, each berry turning up a small black eye. Here is also a thrifty patch of *Yellow Puccoon*, *Hydrastis Canadensis*, four by eight feet, from which large crimson berries have lately been removed. Physicians are always glad to look at it and frequently ask for seeds or roots, the latter of which bud at random in sufficient profusion to multiply the species. The healthy plants are attractive in the shape and color of the leaves and in the color of the berries. Near by are two masses of *Hepatica*, three to four feet across, one of each of our two species. They are still in perfect health, with all the leaves fresh and sound and give promise of a splendid crop of their flowers in early spring. Considerable pains have been taken by our students in contributing individual plants distinguished for flowers of different sizes and colors from white to pink and dark blue.

Three or four years ago I introduced from the south some plants of the *Water-lily* family, known as *Cabomba Caroliniana*. These were placed in two ponds, but until this year they escaped notice. One mass is now twelve feet in diameter.

The flowers are small and white, but the stems with their bright green dissected leaves are two inches in diameter and have a striking appearance. Nothing in the garden is more admired by visitors of all classes than two large masses of the pink Water-lily from Cape Cod.

For late summer and autumn I commend *Polygonum Virginianum*, familiar in moist thickets. The ovate or lanceolate leaves when grown in the open are dark green, with a velvety appearance. The plants are about four feet high, including the slender spikes, which are from twelve to twenty inches long. Our compound plant is eight feet in diameter. In the woods the leaves are lighter and the calyx is green, but when exposed to the sun the calyx is crimson. The long, slender and naked spikes are rather rigid, and with the persistent crimson calyx, all above the leaves, make a striking picture. The botanist is interested in the plant for its plan of distributing its seeds. Each flower-stalk has a joint at the base, where it separates very easily when mature. It dries with a tension, so that if touched the fruit goes off several feet with a snap and a bound. The wind or some passing animal shakes the elastic stems, jostling them against each other, and thereby sows the seeds broadcast. The two slender, stout, persistent styles are recurved at the apex, and catch on convenient objects like a burr. Should there be a freshet the seeds, enclosed by ovary and calyx, will float with the sticks and leaves. Besides its beauty of form and color, its other peculiarities make it an attractive plant, and yet no one has thought enough of this hardy perennial to give it a common name. It is nearly allied to Prince's-feather, and is more interesting than that plant. Growing next to it, and belonging to the same genus, is *P. arifolium*, Halberd-leaved Tear-thumb. This is a neat annual, not pleasant to handle, but interesting as it is seen climbing over bushes and holding on by its recurved hooks. The heads of small white flowers are not gaudy, but they are well placed on long stems above the dark green leaves.

In damp summers the native Wild Balsam-apple, *Echinocystis lobata*, plays a conspicuous part along the river-bank among the bushes. It rambles about, sometimes covering almost everything for a space of forty feet and stands ten to twenty feet above the ground. In such places it is peculiarly attractive at this season. I have recently introduced and planted near this species the One-seeded Bur Cucumber, *Sicyos angulatus*. These plants ramble over and under each other in a surprising fashion, sometimes one having the advantage and sometimes the other. Last year the Balsam-apple was the more prominent; this year I think the Bur Cucumber is ahead.

The deep blue flowers of Wild Comfrey, *Cynoglossum Virginicum*, are pleasing, and resemble a large Forget-me-not, with flower-axis somewhat drawn out.

In a low secluded spot exposed to the sun Castor-oil plants grow ten to fourteen feet high, with stems nearly as large as one's wrist. While the flowers are interesting, these are not as attractive to the general visitor as the great tropical-looking leaves.

South of an exposed bank I had twenty to thirty loads of sand drawn in from the flats of the river and have had it fertilized a little. Here a mixture of plants is grown which thrive in such soil, including Lupines, three species of *Ceanothus*, hardy Cacti, Bearberry, Sand Cherry and many others. Among the favorites are *Solidago rigida* and *Helianthus occidentalis*, which several times failed under seemingly better treatment. *Tanacetum Huronense*, from the sandy shores of the Great Lakes, makes itself at home and strives for more space than we are willing to allow. The bunches of large yellow heads of this Tansy above the healthy feathery leaves are worth inspection. And here *Desmodium rotundifolium* rambles in great perfection, the prostrate vine overhanging some boulders. Its round leaflets always attract attention, while the light pink flowers and peculiar fruit help to give variety.

Lobelias are grown in an artificial depression where they can be flooded when necessary. The bright blues and the cardinal flowers are well known. For a few weeks in September the wide row of several species of *Hibiscus* is at its best.

Agricultural College, Mich.

W. J. Beal.

Notes from Rochester, New York.

To the Editor of GARDEN AND FOREST:

Sir,—There is always a scarcity of flowering shrubs at this time of year, and, indeed, the flowers of perennial herbaceous plants are not too plentiful in the border at this season, and any additions are welcome.

It was a surprise to see in Highland Park, at Rochester, New

York, some very fine specimens of *Vitex Agnus-castus* in full bloom. Mr. Dunbar stated that the plants were not hardy and had been killed down to the ground each year. The resulting growth gave them the appearance of being herbaceous instead of shrubby plants. The long spikes of bright lavender-blue flowers were extremely ornamental and distinct. *V. Agnus-castus* and *V. incisa* are the species grown there, the latter being the inferior in point of color, but both are desirable where a collection is grown. This plant will probably prove hardy enough in a moderately dry soil in all of the eastern states, as the winters at Rochester are more severe than in Massachusetts, and much difficulty is found there with evergreens that ordinarily are quite reliable here. It was surprising to see many plants of doubtful hardiness thriving there, and I was shown a vigorous young plant of *Sequoia gigantea* that had survived the past winter without protection and which had grown nearly two feet this summer.

The English Broom, *Genista scoparia*, has also been successfully grown there for a number of years, long enough to form a handsome bush, and at this time is covered with seed-pods after a fine display of bloom. It would be interesting to see if the variety *Andreanus* will prove hardy there also. This is only a form of *G. scoparia*, but it comes from the hills of Normandy, where it appeared as a sport among the common Broom, and, unfortunately, has not proved as hardy as the type, if the latter is taken from a British-grown plant. It is well known that geographical forms of the same species have varying degrees of hardiness, and while we hope Mr. Dunbar may succeed in acclimating the variety *Andreanus*, this is doubtful. A plant of this species tried here, and which was well established on its own roots, did not survive the first winter.

There is much of horticultural interest in Rochester in its many large and famous nurseries, and the fine system of parks that has recently been formed is already a credit to the city. This system includes the Genesee River Gorge, a feature unique in its way and of inestimable value for its magnificent scenery, and the gorge has been made secure to the public for all time; the South Park, with its broad pastoral views; and the more highly developed Highland Park, where it has been the object to have every species of deciduous shrub that will grow planted according to its botanical affinity. This has been accomplished in a most happy manner on sloping hillsides that prevent monotony and give easy access by grassy walks.

So. Lancaster, Mass.

E. O. Orpet.

Peaches in the Ozark Mountains.

To the Editor of GARDEN AND FOREST:

Sir,—The big packing tent in an Ozark orchard of Elberta peaches is a lively and interesting place. Through the centre of it runs a long table, at each side of which the packers, who are all women, sit on boxes set on end. Men in a straggling line pass out, going with empty cloth-lined baskets, and return them filled with richly-colored fruit. There is a general foreman, who is responsible for the picking, packing, shipping and marketing, an under foreman, known locally as a "straw boss," to every six pickers, and a forewoman for the women packers, of whom there are as many as forty in the busy season. So-called "lackeys," men and boys, keep the packers supplied with fruit, baskets or boxes and wrapping paper, and remove the filled packages from the table. In the tent an efficient forewoman is in authority, and moves about the table with her eyes on every worker, while her constant admonitions and directions suggest new ideas to the consumer, who, after much experience in emptying such packages, sees them for the first time being filled. The forewoman decides what sort of packages shall be used for the fruit which is then being picked. The finest grade is packed in "California" boxes, the next in six-basket crates, and the lower grades in four-basket crates, and "thirds," the familiar peach boxes that hold one-third of a bushel. With her cry of "All thirds," "Californias," etc., as the case may be, the empty packages are set within reach, the women at once begin to handle the fruit, and the watchful forewoman is fluent in a series of remarks, as, "handle them fast, girls," "just as fast as you can," "remember! the long way of the peach, the long way of the box, and the blush side up every time," etc.; but "blush up every time" is most frequently repeated. And the workers, too, have their say. The eight and one-half inch square white papers rustle and crumple under the swiftly moving hands, and the cries of "peaches out of the way" and "more peaches," or "peaches off" and "peaches on," come in rapid succession. Handsome sprays of peach-leaves are laid on the top of all the packages by boys. Men then fasten

on the lids, others stamp the boxes and crates containing the highest grade, Fancy Elbertas, or Fancy Freestones, and those holding the next grade, Choice Elbertas, or Choice Freestones. The crates are carefully loaded into the high-boxed peach wagons and driven slowly to the shipping shed at the railroad siding. During the rush in the Elberta season two refrigerator cars were dropped at the railroad station of the Olden fruit farm every day. As soon as enough crates to fill a car are piled on the platform they are deftly and rapidly packed in the car, each box or crate being isolated by using inch-square cleats horizontally and one and a half inch cleats vertically between the packages, so that the cold air circulates freely around every package. Four tons of ice are used in icing a combination refrigerator ventilator-car. A fruit express train picked up the cars every evening from near the Arkansas line to Cedar Gap, making passenger time from that point to Kansas City.

Brighton, Ill.

Fanny Copley Seavey.

The Dikeman Cherry.

To the Editor of GARDEN AND FOREST:

Sir,—Referring to your note about the Dikeman Cherry, on page 338, and which I saw as one of the judges at the New York State Fair, this new variety seems to meet all the requirements of a good late cherry that will bear shipping, and does not decay. The cherries at the State Fair had been picked on Friday, August 20th, in Michigan, and shipped nearly 500 miles by express to Geneva, New York, then sent to Syracuse and put on exhibition. They were in sound and fresh condition, and I may add that on Saturday, August 28th, I brought some of the fruit home with me that had been on the plates during the whole week, and it is now, August 30th, on my table perfectly sound after all this exposure.

The Dikeman is a beautiful solid, meaty, black cherry of the best quality. Taking these characteristics with its lateness and shipping and keeping qualities, it is the most promising cherry of which I know, and Mr. Willard is to be congratulated on securing so valuable a prize. Mr. Willard found the cherry growing in the light sandy soil of Oceana County, Michigan, a short distance from the lake, the tree presumably a seedling. A few buds were secured, and these were top-budded on some bearing trees in Mr. Willard's orchard at Geneva, and from these a few trees have been grown.

I might also mention the President Wilder currant, of which a remarkable exhibition was made at this fair by Mr. Willard. The fruit was large, clusters long and filled to the end with beautiful berries which maintained their size along the entire cluster. The fruit is of first quality and as large as that of the Cherry currant, more juicy and with less seeds and acid than any other variety of which I know. The leaves are thick and large, the wood strong and loaded with an immense amount of fruit. All these qualities must make it a popular and profitable market currant.

Lockport, N. Y.

J. S. Woodward.

Crested Begonias.

To the Editor of GARDEN AND FOREST:

Sir,—An error in punctuation in my note on Crested Begonias, September 8th, page 353, unfortunately confused the description. It should read: "But sometimes attached to all the petals, and sometimes only to either the inner or outer pair, a growth springs from the lower section, though not from base of petals."

I might add that this growth is of the same texture and color as the petals, but is not in the nature of a doubling of parts. It seems to be simply a sportive growth in an entirely new direction.

Elizabeth, N. J.

J. N. Gerard.

The Cheney Plum.

To the Editor of GARDEN AND FOREST:

Sir,—In writing to GARDEN AND FOREST some weeks ago regarding the ornamental value of Plum-trees I made special mention of the variety propagated under the name of Cheney. I have just now received some very fine specimens of the fruit of this variety from Mr. John Craig, of the Central Experimental Farms, Ottawa, Ontario. Though not so notably prolific as some American varieties, Cheney bears fruit of a very superior quality and appearance. Those sent by Mr. Craig are somewhat unequally elliptical, with a longitudinal diameter of 3.5 cm., and a transverse diameter of 3.1 cm., with a visible suture; bright dark red, with a very thin white

bloom, almost without dots; skin thick and firm; flesh firm yellow, of fine quality; stone medium large, much flattened, cling. As stated in my former communication, the tree is a fine grower, and especially pretty in blossom. Professor Bailey rates the fruit as good to very good, and says that this is one of the best varieties. It seems to me to be a very satisfactory example of the Nigra group of native plums—a group very poorly represented in cultivated varieties as compared with the western type of *Prunus Americana*. It is, therefore, interesting as a type besides being useful as an ornamental and as a fruit tree.

University of Vermont.

F. A. Waugh.

Recent Publications.

Our Native Birds of Song and Beauty. By Henry Nehrling. Vol. II. George Brumder, Milwaukee, 1896.

The first volume of this work was noticed in our issue of April 18th, 1894, vol. vii., p. 159. The present and concluding volume was completed early this year. It may be fairly said that the aim of the undertaking, the filling of a gap between the very expensive and the merely technical books on our ornithology and the combination of popular biographies of our song birds with the presentation of recognizable portraits of them, has been successfully attained with a result that must be useful to a large class of readers. The author has added to his own observations made during residence and travel in various parts of the country copious quotations from the best writers on the subject, and this feature adds much to the value of the book by putting the general reader in possession of a great deal of interesting matter he would not be likely to meet with otherwise. All technicalities have been carefully avoided, the specific descriptions being appended in smaller type. Interspersed throughout is much information about plants, wild and cultivated, with both of which the author is well acquainted, and the descriptions of scenery in various parts of the country show him to be a true lover of Nature.

The plates, printed in colors from drawings by Ridgway, Goering and Muetzel, vary considerably in style and quality, those of the German artists being overcrowded with figures and overloaded with heavy backgrounds. Landscapes, as a rule, do not add to the beauty of ornithological plates, and the simpler the accessories the better. The figures of the birds are generally well drawn and lifelike, and would, in our judgment, look better without such elaborate surroundings. It would have been better, too, to have preserved a more uniform scale in the size of the figures. In the matter of typography the red-lining of the page is not to our taste, but in other respects the work is well printed. The popular interest in ornithology has become so general in this country that a work like the present cannot fail of large usefulness.

Contributions from the United States National Museum, vol. v., No. 3: Studies of Mexican and Central American Plants. By J. N. Rose.

In this very interesting number of the *Contributions* Dr. Rose has given the result of his careful studies not only of the later collections from Mexico and Central America, but of many of the older ones necessarily compared with them. The plan of reporting on separate collections is abandoned in view of the large number of sources from which the plants have been received. The present plan of working up the various collections jointly and reporting upon them by genera or families, with at times revisions and synopses, seems justified by the great body of material at hand, and we think the result before us will be heartily endorsed. Such synopses as those of *Heliocarpus* and *Wimmeria* will be found very useful and suggestive, and the work in family *Cucurbitaceæ* shows the excellent judgment that characterizes all of Dr. Rose's revisions.

The large number of plates is a feature, seventeen of them being given to the thirty-four pages of text. They are as satisfactory as any that have been published in the series.

Notes.

Messrs. Ellwanger & Barry on the 4th of September shipped a collection of 125 varieties of pears from the Mount Hope Nurseries, Rochester, New York, to the Horticultural Exhibition at Hamburg, Germany.

American readers of *The Garden* will be interested in the colored plate of *Lathyrus splendens* in a recent issue of that journal. This perennial Pea, native of southern California, flowered at Kew for the first time this year, and for three months there was a continuous display of the beautiful rich red-maroon blossoms.

In the fancy-fruit stores, among choice and handsome offerings, are luscious Kelsey plums with honey-like flavor and large nectarines from the Pacific coast; spicy muskmelons from Rocky Ford, Colorado; new-crop lemons from Florida; so-called Valencia oranges, from California, held over in cold storage; Prickly Pears, the fruits of *Opuntia Tuna*, from the Mediterranean, and the first winter melons, from fields near Naples.

Since the time of the Pharaohs lime has been used in European countries in agriculture, and perhaps more experiments have been made with this substance in connection with plant growth than any other chemical. A condensed summary on the practice of liming has just been published by the Rhode Island Experiment Station, which gives in a brief compass some essential facts that every agriculturist ought to know, and we commend this little treatise of a score of pages to the careful attention of every student of agricultural science.

An instructive circular has just been published by the Division of Forestry, relating to the age of trees and the time of blazing them as determined by annual rings. The difference of the layers of spring wood and summer wood in coniferous trees, as well as the structure of ring-porous woods like the Hickory and Locust, is explained so that the careful student receives all needed directions in making his investigations. The circular covers less than a dozen pages, but it is so carefully illustrated and prepared that no novice can read it carefully without receiving genuine instruction.

Mr. Joseph Meehan recommends *Pueraria* (*Dolichos*) *Thunbergiana* for a trellis on the veranda. The best opportunity is thus afforded to train this vine so that its fragrant rose-colored flowers are not hidden under the luxuriant foliage. The perennial *Plumbago* *Larpenæ* is now showing its blue flowers in Germantown, where it is sometimes at its best during October. Mr. Meehan calls attention to the advantage of cutting off the flower-heads of *Spiræa Bumalda* in July when the first blooming season is past. With this attention this plant is now flowering as profusely as early in the season, though the flower-heads are not as large, and its season may be indefinitely prolonged.

Mr. J. G. Jack will conduct a series of lectures and field meetings at the Arnold Arboretum, beginning September 18th and closing November 6th, for the purpose of supplying popular instruction about trees and shrubs which grow in New England. The intention is to indicate by comparison the easiest means of distinguishing the common native trees and shrubs and to recognize foreign species which have been introduced into gardens. The ornamental and useful properties of these trees and shrubs, their habits of growth and other peculiarities will be considered, and particular attention will be given to their identification and general aspect as they lose their leaves and prepare for winter. The classes will meet on Saturday mornings at ten o'clock and on Wednesday afternoons at three. Applications or inquiries may be addressed to Mr. J. G. Jack, Jamaica Plains, Massachusetts.

Professor Plumb has recently followed the example set by many other American students of Agriculture and visited Rothamsted, the scene of the great series of experiments which have been persistently carried on for more than half a century in order to ascertain some trustworthy data in regard to the exhaustion of plant-food from the soil. Interesting as is this estate, it is very plain that Sir John himself will continue to be the crowning attraction of Rothamsted as long as he lives. He wears his eighty-three years like a man of middle age and tramps his fields as sturdily as if he were no more than thirty-five. Sir Henry Gilbert, his companion for more than fifty years, and who has been helping Sir John carry out his experiments, is an equally well preserved example of English country life, and every civilized man who takes an interest in agriculture will unite with Professor Plumb in wishing to these

eminent Englishmen many and fruitful years to their generous work.

Professor J. B. Smith, of the New Jersey Agricultural Experiment Station, has sent out a circular in relation to the San José scale, which briefly advises that all infested bearing Apple, Pear, Plum and Peach trees should be sprayed thoroughly in September with undiluted kerosene in the middle of a clear, sunshiny day. By undiluted kerosene is meant the ordinary burning fluid used in lamps exactly in the condition in which it is purchased, and it should be applied in the finest possible spray, so that every part of the plant should be wet thoroughly, but no more. One application is sufficient, and it may be delayed until the fruit has been removed, although the sooner it is now applied the better it will be. The treating of nursery stock or of very young trees in this way with undiluted kerosene is not now recommended. The details of the experiments upon which this treatment is based will be reserved for the close of the season, but Professor Smith sends out this circular so that something may yet be done before the year closes.

The problem of food supplies for two million persons crowded on a limited area is an interesting one, and the buyer of choice products at high prices need not have philanthropic impulses to wonder occasionally how the majority of the city's population is fed. Of a half dozen characteristic markets for the masses scattered through New York City, one of the best known is "Paddy's Market," held each Saturday from the middle of the afternoon until eleven o'clock at night, on Ninth Avenue from Thirty-eighth to Forty-second Streets. In the evening these four blocks are a scene of surprising animation. On both sides of the wide avenue wagons are drawn up lengthwise along the curb, the horses headed toward the middle of the street, with push-trays, barrels and crates crowded in, and all heaped with offerings. Much space is also occupied on the sidewalk along the fronts of the stores. The stock is arranged with considerable neatness, and in some instances the open wagons are entirely lined with heavy white paper. Often a wagon holds but one kind of fruit or vegetable, though an assortment is sometimes offered. Many flaring torches on the wagons add a weird brightness to the city's electric lights. The rumble of elevated trains overhead and the noise of street cars almost escape notice in the harsh guttural and nasal shouts of venders. A wagon-load of onions may have for its neighbor a wagon-load of peaches, or melons, corn, cabbage, celery, plums, beans, apples, bananas, cucumbers, potatoes, pears, chickens, hams or fish, not taking into account household utensils, shoes and clothing. On a hot night lemons are abundant and sell at five cents a dozen. Among vegetables, string-beans now seem most in demand. Pails are the ordinary and enticing form of measurement and hold from one to four quarts. A small pailful of beans sells for five cents early in the evening, and later on overstocked dealers look for buyers at three cents. Boys mingle among the throngs on the sidewalks and offer heaped pails of vegetables and fruits for a few pennies. Women stand at the street corners with large baskets containing eggs, and in each instance a candle, and make a show of testing the eggs by its light, at the same time keeping an eye on mischievous lads in the crowd who watch the chance to shy a pebble into the fragile collection. English is heard almost entirely, though there are some Polish and Italian sellers. The orderly crowds of buyers are mostly Irish, Italians and negroes. The purchases are carried away in arm-loads of brown paper parcels, in paper and muslin sacks, and in capacious baskets with dome-like lids, and occasionally aprons hold an overflow, while, as the evening progresses, half-bushel baskets of peaches prove an irresistible bargain to thrifty housewives who struggle along with them. A particularly fragrant stand has a collection of fresh herbs from a suburban garden and the woods about Fort Lee. Large Mullein leaves, plants of Dandelion and stalks of Boneset, Horehound and Tansy are confidently recommended as remedies and sold in generous bunches at five cents each; Mint is said to drive away ants, and Pennyroyal is sold to hang in open windows and keep away the mosquito plague of this wet summer. Policemen seem even unusually scarce here, and from the two hurriedly questioned it was learned that while this market has been carried on during considerably more than a quarter of a century, it has only been organized within the past three or four years. The licensed dealers pay a small tax for the space occupied and share in the cost of promptly clearing away the waste. Only rare and choice fruits and vegetables are missing here. The quality is fair for this class of market, with almost no really unwholesome stock, and the low prices put substantial meals within the reach of persons of very small means.

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The Massachusetts Trustees of Public Reservations.

THE work of the Trustees of Public Reservations in Massachusetts continues to maintain the important and interesting character that has distinguished it from the start, six years ago. This public-spirited corporation furnishes a striking instance of what can be accomplished by furnishing a nucleus for the aspirations and the efforts of those who have at heart any special line of action for the common good. In such work the greatest factor, perhaps, is the obtaining of an adequate leverage from which things can be moved. The Trustees of Public Reservations have supplied such a leverage for the lovers of "beautiful and historic places," to quote the happy phrase with which the late Charles Eliot expressed the aim of the movement at its inception. The corporation has done little more than furnish this leverage; the friends of its work have done the rest.

The Massachusetts trustees are the pioneer body in their peculiar line of activity, and their example has been successfully followed in other parts of the world. For instance, when the work of the Massachusetts corporation became known in England, it was felt that this was just the sort of instrumentality for the accomplishment of a much-needed work there, and the result was the organization of an influential society with similar aims, called the National Trust for Places of Historic Interest or Natural Beauty. On this side of the ocean the Appalachian Mountain Club, of Boston, has been endowed by legislative enactment with similar functions; the desirability of action for the preservation of notable features of mountain scenery in New Hampshire led to this step, and the club, therefore, as a rule, pursues its activities in this line outside of Massachusetts, where the work of the Trustees of Public Reservations amply covers the ground. In other parts of this country organizations have been formed on lines similar to those of the Massachusetts corporation, and good results are reported from them.

The work of the Trustees of Public Reservations in Massachusetts has been of two kinds—suggestive and administrative. Although composed chiefly of persons of means and influence, the corporation has no large funds directly at command. But when work of an incentive

character has seemed desirable the necessary means have been forthcoming, and the supplying of needed funds has been an essential preliminary for the undertaking of any special piece of administrative work. Its work of incentive, or for purposes of public information, has been particularly desirable. Of this kind were the notable investigations concerning the public open spaces in the shore towns of Massachusetts which the trustees caused Mr. J. B. Harrison to make, the results of which were first made public in the pages of GARDEN AND FOREST; also the full and accurate statistics concerning public open spaces in the cities and towns of Massachusetts contained in the second annual report of the trustees; and finally, the report on the open spaces in the shore towns made by Mr. H. B. Hastings, supplementary to the work of Mr. Harrison, given in the third annual report.

It is largely due to the incentive of this corporation that the legislation was obtained instituting the Boston Metropolitan Park Commission, whose work is transforming the country about the New England metropolis into scenes of remarkable and enduring beauty. And when the vexed question of the Province lands at the extreme end of Cape Cod came up for consideration the Trustees of Public Reservations were selected by the Massachusetts Legislature to investigate and report upon the subject. In consequence, after a controversy of nearly two centuries, the residents of the greater part of Provincetown were for the first time given full title to their holdings and a scientific policy was adopted for the administration of the many hundreds of acres of state lands there, including the reforestation of the great sand-dunes that were threatening the town and the harbor with ruin.

Invaluable information has been given by the investigation, under the auspices of the trustees, of the public's rights upon the seashore. There are other lines of investigation which might profitably be entered upon, such, for example, as the rights of the public in small streams and in ponds; any young student interested in these lines of research might do real public service by bringing to light the various curious and instructive provisions concerning such matters contained in the old colonial and provincial laws. The Trustees of Public Reservations would doubtless supply the medium of expression for any investigations along these lines.

For a while it seemed as if there would be little administrative work for the trustees. But, as time has passed, various opportunities for usefulness in this direction have presented themselves, and it is probable that before long the holdings of the corporation will be scattered throughout the commonwealth. The procedure in these matters is simple, and entails but slight burden upon the standing committee of the trustees, upon which rest the active functions of the corporation. When investigation shows the desirability of preserving any beautiful or historic spot in any portion of the commonwealth the trustees assume the charge thereof on condition that the funds necessary to maintenance be provided. Thereupon regulations for the proper use of the place are adopted and its care is given into suitable local hands. Virginia Wood in Stoneham was the first gift to the public placed in charge of the trustees. This has become an integral part of the great metropolitan reservation of Middlesex Fells, and therefore requires but little direct oversight from the trustees. A bronze tablet, inscribed with the facts concerning the gift, has been affixed to a ledge in the woods. Goodwill Park, in Falmouth, was given into the hands of the trustees for the benefit of the people of that town by Mr. Joseph Story Fay, and it has been placed in immediate charge of a local committee.

This year a particularly charming piece of property has been given into the keeping of the trustees by Mr. Augustus Hemenway, of the Metropolitan Park Commission, who takes an active interest in the preservation of beautiful scenery. A feature of Charles River landscape, second in picturesqueness only to Hemlock Gorge, will thus be

preserved for all time. Between the townships of Medfield and Sherborn there is a place where the narrow stream flows between a bank of woods and a high Hemlock knoll; behind this knoll lies a sunny meadow, bordered by more high woods. "Locally," says the recent report of the trustees, "the little gorge is known as Rocky Narrows, and the little meadow as the Dingle Hole; but many canoe men from the neighborhood of Boston know the place as the Gate of the Charles." The eastern bank of the river at this point is the property of the commonwealth, being a part of the grounds of the State Asylum at Medfield, and the area on the western bank that has been conveyed to the trustees comprises about twenty acres.

The committee notes that much of the most charming and most easily destroyed scenery of Massachusetts is found along the banks of ponds and streams, and it is represented that it would be for public advantage if narrow strips of such waterside lands could be secured by interested and generous citizens and given into the charge of the trustees. "Many such strips are found between country roads and streams or ponds, and many other strips of similarly useless but beautiful land are to be found bordering roads in rocky or steep places. Nothing could more directly help to keep the state a pleasant and beautiful place to live in than such preserving of the local roadside scenery. Such strips, as well as hilltops, ravines, bits of seashore, and any remarkably beautiful spots will always gladly be taken charge of by this Board, provided some little money to form a maintenance fund comes with each gift."

It is remarked that other worthy objects for enthusiastic generosity are places of antiquarian, historic or literary interest; for example, visible traces of Indian villages and earthworks of the Indian wars, and the homes of eminent persons. There are also places of more strictly scientific interest which ought to be permanently preserved; a few remarkable botanical localities, for instance, such as *Rhododendron* or *Holly* thickets, and a few places of extraordinary interest to geologists. In the matter of local pleasure-grounds where it may be impracticable to establish regular park commissions—as in the case of Goodwill Park, in Falmouth—the Trustees of Public Reservations form a particularly desirable organization for their care.

The Swamps of South-eastern Missouri.

THE botanist familiar with the sphagnum bogs of the Lake region and the east is sadly disappointed in his first botanizing in the south-west at finding nothing comparable with them. In their place he finds muddy sloughs in the river bottoms, and even more muddy ponds, more or less dried out, representing the site of abandoned brickyards in the clay regions. Now and then, too, the springy margin of an artificial fish pond comes in for exploration. In such places, which at first seem quite unpromising, and the exploration of which is far less pleasant than that of the clean swamps of the north, are found, nevertheless, many plants which affect the eastern bogs; and while *Sarracenia* and the swamp *Ericaceæ* are not met with, they are replaced by plants which form equally desirable additions to the herbarium, though they may not afford equal pleasure in the collecting.

But to the eastern botanist, few localities offer a charm of novelty equal to that afforded by the deep swamps of Missouri and Arkansas, lying in general along the region of Crowley's Ridge. Remnants of the ancient delta of the Mississippi River, these swamps are everywhere traversed by streams, the sluggish flow of which has seemingly more than once changed its directions, while even to-day a flood period like that of last spring causes the backwater of the Mississippi and its larger western tributaries to more or less overcome their limits. This is the land of cotton, and while corn is here king, no considerable amount of good fiber is shipped out each fall and winter.

A little further to the north and west, in the hill country,

the short-leaved Yellow Pine (*Pinus echinata*) is abundant, and one lone tree far down on the lowlands of Dunklin county suggests speculation concerning the earlier range of the species; but the lumber cut here is Cypress (*Taxodium*), Black Gum (*Nyssa sylvatica*), Cottonwood (*Populus deltoidea*), now coming into considerable use for cheap boxes, and the various White Oaks, chiefly for railroad ties. Of the latter, the true White Oak (*Quercus alba*) is perhaps the most abundant on the higher ground, but in the lowlands the Cow Oak (*Q. Michauxii*) is abundant, and often of very large size, and—a surprise to one who knows the Post-Oak barrens of the Ozarks—the Post-Oak (*Q. minor*) is almost equally common. Perhaps nowhere else in the United States is there to-day so large a supply of White Hickory (*Hicoria ovata*) as in this region; and in the rich damp woods below Delta from one hundred to one hundred and fifty feet represents the prevailing height of this species, the Texan Oak (*Q. Texana*), Sweet or White Gum (*Liquidambar*), and their associates. Here, too, *Salix nigra*, the Water Oak (*Quercus nigra*), and the Turkey Oak (*Q. digitata*) reach a great size.

The deep Cypress swamps lying along the streams, however, are the most remarkable in their interest. Except in seasons of great flood, the water of these sunken lands varies little in its general level, and the Cypress knees correspond approximately in height with this level for many miles, rising so close together between the trees that only a native can find passageway between them for a dug-out canoe. In such a canoe, with an experienced guide, barring the discomfort of the tailor's seat which must often be affected, one can pass with pleasure for hours silently between the trees, now startling a great turtle into a quick plunge from its sunning place on an emergent log, or in turn be startled by the quick call and splashing flight of a pair of mallards, and again recoiling as one's elbow almost brushes against a large water snake—a water moccasin, as it is here called—lying afloat on a snag; drinkable the water scarcely is, but it lacks the turbidity of the larger streams, and, stellate with *Cabomba* and *Jussiaea*, and often for miles carpeted with a dense layer of beautiful *Azolla* with intermingled *Lemna*, *Spirodela*, *Wolffia* and *Wolffiella*, it presents a delightful appearance not soon to be forgotten. But the novice who dips into it, or the botanist whose zeal leads him to gather its choice surface coating with incautious hand, is quite likely to learn that in the latter are certain small hemiptera, whose pungent thrust is no less painful than the sting of a hornet, though happily not so serious or lasting in its effects.

Here the *Nelumbium* is at home, and in season its great dew-studded leaves, with the curious bronzed lens of their lower surface conspicuous in the slanting light, and charming creamy flowers, form an almost impenetrable jungle in the waterway. But most marvelous of all are the masses of *Polygonum*, which, rooted perhaps ten or fifteen feet below the surface, finally emerge, making a tangle on which, in hip-boots, one may wade with as great security as on the more solid land.

The trees of the deeper water are chiefly Cypress (*Taxodium*) and Tupelo (*Nyssa aquatica*), the greatly dilated bases of which rival anything of the kind that I have ever seen. Not infrequently within the hollow trunk of some old tree may be seen a perfect forest of young knees from its younger neighbors or even from its own roots, providing the aëration which these would otherwise never get in this region of perpetual water. Now and then old Cypress stubs, with gray bark and large branches emerging from the giant trunks close to the water level, stand in marked contrast with the tall, clean stems of a later generation, suggesting the doubtful hypothesis that the strip of land on which they grew has sunken locally below the general level of the stream.

Elsewhere, one finds *Amorpha fruticosa* and *Itea Virginica* as terrestrial plants, and indeed they are so found here in places; but out in the channels they are to be seen in numbers, accompanied by *Wistaria*, *Rosa Carolina*, and

a host of herbaceous species, rooted on the decaying remains of old tree stumps, or even on the accumulated debris of many generations of *Polygonum*. At the level of the flood water, marking the point where their drifting seeds lodged, but in summer some inches above the water line, are tangles of *Bidens*, *Cyperus*, and other herbs, firmly anchored and vigorously growing in the crevices of the bark of living trees, which still higher are covered with foliaceous Liverworts, Mosses, Colleniacious Lichens, and not infrequently, great masses of *Polypodium incanum*.

Where the water is shallower occur the Swamp Maple (*Acer rubrum*, *Drummondii*), *Planera*, the Swamp White Ash (*Fraxinus profunda*), *Catalpa*, and Water Locust (*Gleditsia aquatica*), which, on the gradual intrusion of the low shores or islands, give place to the usual swamp timber, festooned with Supple-Jack (*Berchemia*), Cross-vine (*Bignonia capreolata*), Trumpet Creeper (*Tecoma radicans*), and Grapes. And the beautiful pink clusters of *Mikania*, and the blue foliage of *Cissus* stand out in rich contrast with the prevalent green. After a first day of this unwonted experience one emerges into the usual noise and bustle with the feeling that he has visited another world quite different from anything he has ever seen, and scarcely knowing which to admire most—the great solitude of the place or the beautiful way in which Nature's hand has adapted her children to a most unusual home.

Missouri Botanic Garden.

Wm. Trelease.

Sun-scald and Means for its Prevention.

SUN-SCALD, as the term is commonly used in the north-west, is the partial or complete destruction of the bark of trees on the part of the trunk or main branches facing the south-west, due, apparently, to exposure to the sun's rays. It is a question whether this damage occurs during the growing season or during winter or early spring. The term is more commonly used with reference to fruit-trees.

My own observation leads me to the opinion that the damage known as sun-scald may occur either during early spring or during summer, under certain conditions, but that the causes of the trouble differ at the two periods. In early spring it probably results from alternate freezing and thawing of the bark, especially when unseasonably warm weather, that excites the cambium cells to activity, is followed by freezing weather. At this season it is most common on young trees on which the bark has not yet become rough and the living bark has not been inclosed by dead cork layers. Often the trouble does not reach to the cambium, and hence does not immediately injure the tree further than to destroy the outer bark layers on the exposed part. In severe cases the bark of older trees may be entirely destroyed on the south-west exposure, so that it loosens from the wood and finally cracks open, exposing the wood to the attacks of injurious insects and fungi.

Sun-scald often occurs during summer on trees that have been recently transplanted or over-pruned, and sometimes during protracted drought on trees of certain species that have not been interfered with. In all these cases the cause is probably the same, namely, the transpiration current, which conveys the water from the soil to the leaves, is so much checked that the bark of the trunk becomes overheated, causing death of the cambium. The Soft Maple, *Acer saccharinum*, when properly treated, is entirely hardy at Madison, Wisconsin, but I have seen trunks of this tree several inches in diameter, the tops having been too severely cut back, with a patch of dead bark some inches wide, and extending from the ground to the lower branches on the part of the trunk facing the south-west. Trees of the Sugar Maple and White Birch, taken from the nursery and planted where their trunks are fully exposed to the sun's rays, are often destroyed by sun-scald the first or second season unless their trunks are shaded. The trouble is not immediately apparent, and is frequently not discovered until too late,

for the foliage of the tree remains fresh. But examination of the bark facing the south-west a short distance above the ground reveals the fact that it is lifeless and that borers have gained entrance beneath it. The latter not only work beneath the injured bark, but eat into the cambium of the live part, thus often completely girdling the tree.

Fortunately, the preventive of sun-scald is very simple, and surrounding the bark with non-conducting material, or shading it in the exposed part, is all that is necessary. Several devices are in use for this purpose. A thin board is sometimes tacked to the trunk so as to face the south-west, or two boards nailed together in the form of an eaves-trough are sometimes tied to the trunk. A single narrow board sharpened like a stake and driven into the ground close to the trunk facing the south-west answers the purpose fairly well. A hay rope wound about the trunk from the ground to the lower branches is often used. A screen, made by weaving common house lath together with wire, has been much used in Wisconsin. This device is rather heavy for slender trees, and if put on so as to reach from the ground to the lower branches it sometimes heaves up in winter, and so does harm. Rye-straw set upright about the trunk and tied on with wool twine makes a protection that costs but one cent for each tree, and is readily applied to a crooked trunk and to the lower branches. Experience shows that this will last five years, which is usually as long as protection is needed. The codling moth and other injurious insects do not appear to harbor beneath this protection, as might be supposed. It has recently been proposed to cheapen this protector by sowing a few kernels of rye or oats about the trunk of the tree immediately after planting, a method that has not yet been tested to my knowledge.

Experiment Station, University of Wisconsin.

E. S. Goff.

Foreign Correspondence.

London Letter.

LILY DISEASE.—Cultivators of *Liliums* have for some years been bothered by a disease which attacked the bulbs when dormant. This was not easily detected, especially in imported bulbs, but soon made its presence evident when the bulbs were planted in moist soil. Its ravages among Japanese Lilies have lately been most alarming, and I believe it has also got into the Lily-fields of Bermuda. Mr. Massee, of Kew, has investigated some diseased bulbs of *L. speciosum* and *L. auratum*, and the results are published in a recently issued number of the *Kew Bulletin*. The disease is first revealed by the discoloration and softening of the base of the bulb-scales, and this increases until finally the whole bulb becomes pulpy and brown. This is caused by a fungus which is described by Mr. Massee as a new species, namely, *Rhizopus necans*, and figures of it accompany his paper in the *Kew Bulletin*. He found that the fungus could not penetrate the unbroken tissues of the bulb-scales, but gained an entrance through wounds and especially through broken roots. He recommends a short immersion in a one per cent. solution of corrosive sublimate or of salicylic acid for diseased bulbs, neither of these substances having any injurious effect on them if not immersed longer than fifteen minutes. In addition to Lily-bulbs it readily attacks and destroys the bulbs of *Narcissi*. Mr. Massee recommends a change of soil for the cultivation of the bulbs, as the fields in which the Lilies are grown in Japan are probably saturated with the fungus. He also recommends the careful lifting of the bulbs and partial drying or "sweating" before they are packed for exportation. It might be well to dip all the bulbs in a solution of salicylic acid before packing them should there be any suspicion of the presence of the fungus. Another disease has lately attacked *L. auratum* in English gardens, destroying the strongest stems in a few days, usually when the flowers are about to open. It has been described as a kind of sun-stroke, and it has all the appearance of scalding.

JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY.—The August number of the *Journal of the Royal Horticultural Society* is of exceptional interest. It contains the list of the "Victoria Medallists" (I omitted the name of the learned Canon Ellacombe from the list which I wrote for GARDEN AND FOREST). A paper by Professor Marshall Ward on Microscopic Fungi and their Cultivation will be read with interest by all cultivators who hope for some cure for the many fatal diseases which now affect garden plants. Diseases of Plants (fungoid), by Mr. Massee, is of similar purport and value to the paper by Professor Marshall Ward. The Value of Artificial Manures is set forth in an excellent paper by Mr. J. J. Willis, probably the first authority in England on this question. A paper on the Storing and Preserving of Fruit, by one of our leading growers, Mr. J. Cheal, gives some useful advice to amateurs as to the best means of preserving and utilizing fruit, especially in times of good crops, when the tendency is to let it waste or sell it for nothing.

ORCHID PANS.—Cultivators of Orchids differ as to the merits of block, teak-basket, pan or pot cultivation, and while some prefer to use baskets for almost everything, others declare that pots or pans are better. The fundamental principle to be borne in mind is that epiphytic Orchids cannot succeed in a compost which is not sweet and open or aerated, and therefore a pot or pan open only at the top and with a small hole in the bottom is not likely to prove safe except in certain cases and in careful hands. On the other hand, teak baskets are apt to allow the compost and roots to dry too quickly. I have recently seen some pans which combine the qualities of pot and basket; these are about half their diameter in depth, with an ordinary rim at the top, the bottom conical and perforated with large holes and the sides also perforated with round and elongated holes. These pans are made of red clay and they have holes for wires to suspend them. They are light and they may be stood on a stage or shelf as safely as if suspended. The advantage such pans have over wooden baskets is that they do not rot and afford a lodging place for fungoid and other pests. They do not require potsherds for drainage, and they do not allow the compost to dry too quickly; at the same time it is impossible for plants to become water-logged in them. I saw them in extensive use in the nursery of Messrs. F. Sander & Co., who have found them so admirably suited for Orchids, Nepenthes, etc., that they manufacture them largely, and now offer them for sale. They are almost as cheap as ordinary pans, the price of one six inches in diameter being twopence. They are therefore much cheaper than baskets; so cheap, in fact, that one need not hesitate to break them if necessary when removing the plants into larger pans.

STRAWBERRIES.—A trial of a select number of kinds of strawberries has been conducted at Chiswick during the last two years. The results are published in the *Journal of the Royal Horticultural Society*. Most of the stocks were planted in August, 1895, but some were planted a year later. It should be borne in mind that probably no fruit varies more than strawberries, both in different seasons and on different soils, and therefore sorts which may prove inferior in one season may be first-class the next. Still, there is not much difficulty in separating the good from the bad in a properly conducted trial extending over two years. The kinds which were voted best of fifty-six sorts tried are as follows. They were awarded first-class certificates. The name of the variety is followed by the raiser's name and the year when it received a certificate. Auguste Boisselot (1890): good crop the first year, much heavier the second, quality excellent; ripe June 11. Countess (1896): splendid crop first and second year, flavor delicious; a very fine variety with a wonderful aroma; ripe June 11. Edouard Lefort (Vilmorin, 1896): splendid cropper, flavor delicious; ripe June 11. Latest of All (Laxton, 1894): very heavy cropper, flavor better the second year; ripe June 15. Royal Sovereign (Laxton, 1892): a grand cropper, quality good;

proved to be the hardiest and earliest variety; ripe June 4. Veitch's Perfection (Veitch, 1896): this variety has won a first place among the newer sorts; it was not received at Chiswick in time to be properly tested but it has proved a superb cropper, large and handsome in berry and of excellent flavor. Wonderful (Bunyard, 1897): good crop first year, very heavy second, quality excellent; ripe June 11. I had an opportunity of tasting and inspecting the varieties here mentioned and in my opinion the best of all, judging by the Chiswick test, was Countess.

PHLOXES (*P. decussata*).—A large collection of the varieties of the popular garden Phlox has been formed at Kew during the last two or three years, numbering over one hundred named sorts. These have been obtained chiefly from the Continental nurserymen, who have paid special attention to the improvement of this Phlox, chief among whom is Monsieur Lemoine, of Nancy, who has bred most of the best sorts in cultivation. A selection of the best of them was made this year, and I give here the list in the hope that it will be helpful to any one wishful to grow a select few of this, one of the most ornamental of garden plants. At Kew, at any rate, the following are preferable to all others tried:—White: Berenice, Sylphide. White with dark eye: Pascal. Rose: Ouragon, John Forbes, Le Siecle, Grevin, Adonis, Moliere, Beranger. Rose-purple: Cœur de Lion, Champs Elysee, Roxelane. Lilac: Espoir, Eugene Danzanvilliers. Salmon-red or orange: Aurore, Roi des Roses, Regulus, Tom Welsh, Coquelicot, Toreador, General Chanzy. Blood-red: Coccinea. Bronze-violet: Solon. If I had to confine myself to three sorts, they would be Sylphide, Coquelicot and Tom Welsh. Phloxes like a rich soil, an open, sunny position, and plenty of water. In a dry border they lose their bottom leaves and become unsightly. They are easily multiplied from cuttings.

London.

W. Watson.

The Chestnut in Bloom.

"The bloom is gone, and with the bloom go I."—*Thyrsis*.

THERE never was, nor, perhaps, ever may be a more perfect idea of the transition from early summer into midsummer than is conveyed by two stanzas of "Thyrsis," where the "red and white of May" passes into the deeper coloration of summer, with the "Chestnut-flowers strewn" between. In those perfect lines the English Chestnut is associated with plants of an earlier period of bloom than our native tree, but even closer our native Chestnut touches the high-water mark of the year. After Chestnut-tassels have fallen the time of preparation and expectation has passed, and not only has summer fully come, but autumnal flowers have begun with scouting parties of Asters and Golden-rod.

The past season has been noted for profusion of bloom of every sort, and the "high midsummer pomps" were ushered in by a perfect outburst of bloom from the Chestnuts. Hillside and valley woodlands were in places really illuminated by the cloud of pale golden tassels. One of the most beautiful specimens was a Chestnut found a short distance from Philadelphia, Pennsylvania, near the North Penn Railway (see figure 48 on page 573), and while not remarkably large, it was so perfect in form, so covered with bloom that one could not fail to be impressed by its unusual beauty. It stood far from a house in an open field, and was an ideal tree for the corner of a lawn, with down-drooping branches on one side, and on the other horizontal boughs that framed the landscape beyond. The economic uses of the Chestnut cannot be touched upon at present, but simply its æsthetic side. Every one who travels cannot fail to observe whole districts given up to a petty, trifling kind of planting, and it cannot be insisted upon too often that for broad and lasting effects, for dignity and increasing beauty, we must turn to the Tulip-tree and our Oaks, including with these, of course, the Chestnut. This tree fills such an important part in the landscapes of the Atlantic states, that it is only after passing beyond the Alleghanies one realizes how large



Fig. 48.—A Chestnut-tree near Philadelphia, Pennsylvania.—See page 372.

that part is. It is at home in the forest or beside the roadway; the smallest and plainest farm-house is dignified when sheltered by its overspread boughs, and the most beautiful lawn receives its crowning touch when the autumn sunshine slants through the green and gold of its leaves. The Chestnut disappears soon after one crosses the Alleghenies, and there is nothing the exile on some weary western farm longs for more than the Chestnuts on the hillside at home. An old mountaineer of central Pennsylvania, who has always been to me the embodiment of tree lore, in his recollection of the journey of his parents when returning from the then far west in Ohio, says that near Pittsburgh the wind at night had an unusual sound, and on asking his mother what it was, she said, "It's the wind among the Chestnuts: we're nigh home, my boy."

It is this happiness of association that brings them so close to all who know them; no old-time myths of fatal arrows or sacrificial rites are connected with them, they are simply trees always known to us, and dear alike to the careless happiness of childhood, or quiet autumn rambles of later life.

Harrisburg, Pa.

M. L. Dock.

Cultural Department.

The Flower Garden in September.

FALLING leaves and chilly nights now indicate the ending of the summer season, and although many warm days may still be looked for, frost may come almost any night. Everything susceptible of injury from slight frost should be placed under cover soon. Generally the first frost in this part of Massachusetts occurs about September 25th, but killing frosts do not come until the second week in October. Cuttings of tender plants, such as *Strobilanthus Dyerianus*, *Coleus*, *Alternanthera*, *Acalypha*, etc., should be got in without delay. We prefer to pot up a few old plants of *Coleus* and box off *Alternantheras* and place them on a shelf in a warm house. *Geraniums* we do not insert until early in October, when they are placed in well-drained boxes of sharp sand and stood on a light shelf in a cool house. *Abutilons* are useful as bedding plants; the flowering kinds are suitable for dotting in mixed borders, while those having ornamental leaves are effective in large beds. *Souvenir de Bonn* is one of the best. The new *A. Savitzii* is more heavily variegated, but with us proves a much more delicate grower. Cuttings of these varieties root readily at this season.

Cannas are now probably the most popular, as the most showy, of all flowering plants for ornamental gardening. Some of the older sorts, such as *F. Vaughan*, *Madame Crozy*, *Alphonse Bouvier* and *Queen Charlotte*, are still among the best for bedding purposes, but some of the newer sorts are promising. *Italia*, *Austria* and *Burbank* grow vigorously and are six to seven feet high and of proportionate spread. The flowers, however, lack the substance necessary to stand our hot midsummer suns and bleach out badly. At present, with cooler weather, they are superb, and more attractive than any other sorts. Probably under glass they would do well. *Captain Drujon* is a good yellow in the way of *Florence Vaughan*, the spots on the petals being lighter in color. *Souvenir d'Antoine Crozy* is good. *Papa Canna*, while not a specially attractive color, is a free bloomer. *Beauté Poitevine* is one of the best reds we have grown. *Eldorado* still holds its own as a yellow. *Madame de Montefiore* is also good. *Charles Henderson*, *F. R. Pierson*, *Columbia*, *General de Miribel* and *Gloire de Montet* are all superior, and should be in every collection. *Cannas* are excellent winter-blooming plants, and we pot up at least one of each variety. These are kept quite dry for about two months after watering, and when the *Chrysanthemum* season is past they are placed on a side bench in a house with a minimum temperature of fifty degrees.

The past summer has been specially favorable for tuberous *Begonias*, which have done better than ever before, the moist season suiting them. A border shaded from the afternoon sun, filled with fibrous-rooted *Begonias* in variety and *Fuchsias* and bordered with *Rex Begonias*, made one of the most pleasing displays we have had this season. More of these *Begonias* should be used; among flowering varieties, *Haageana*, several of the *Semperflores* type, *Nitida alba* and *rosea*, *Bismarck*, etc., and among foliage sorts *Thurstoni*, *Metallica*, *Alba picta* and *Manicata variegata*. We plant out all the stock we have used for winter blooming and propagate young stock for

another season's supply in pots. *Fuchsias* do not succeed in beds exposed to full sunlight all day, but when partially shaded and grown as short standards they are pleasing. In Great Britain enormous numbers of *Fuchsias* are used for bedding purposes, particularly in the London and other parks. Beds of Standards are charming there in a groundwork of some dwarf close-growing plant.

Perennial borders are now beginning to look somewhat dishevelled, but a variety of *Helianthus* and *Asters*, with a number of *Phloxes* and an assortment of annuals keep them from looking cheerless. *Anemone Japonica* and its white forms, *Honorine Joubert* and *Whirlwind*, are now in season; these are only hardy here if well protected by leaves. We grow a few in pots for use in the conservatory, where they fill in a blank until *Cosmos* and early *Chrysanthemums* come into flower. Seedlings of various perennials sown during July are now in some cases of good size in nursery rows; more slowly germinating ones of smaller size will be pricked out in a cold frame and kept there over winter. Biennials such as *Sweet Williams*, *Canterbury Bells*, etc., need the ground stirred about them to keep growing well. The more tender sorts are planted in cold frames during October, while the hardier ones are set out in their places in the perennial borders. Dutch bulbs are now arriving, and as soon as frost cuts down plants now in the flower-beds these will be planted out, as they lose their vitality in paper bags.

Late *Asters*, which may not open out before they are caught by an early frost, if lifted with a good ball and planted in a cold frame will give some useful flowers for cutting. Summer-blooming *Carnations* are now at their best. It is a good plan to treat some of these in the same way as the *Asters*. The flowers will come cleaner and last better under glass, and the heavy night dews spot the flowers badly, particularly the white and crimson ones. *Violets* have appreciated the moist summer and look exceptionally well. The plants have recently been transferred to their winter quarters, as the heavy September dews, followed by hot days, seem to be specially favorable for the spread of the dreaded "spot."

Taunton, Mass.

W. N. Craig.

Some Showy Annuals and Perennials.

A LARGE bed of *Cleome spinosa* is much admired for its large, upright racemes of showy rose-colored flowers. This exceptionally good annual plant can be recommended for large beds in open sunny positions, where the flower-clusters will keep on elongating and blossoming for two or three months. Our plants are raised from seeds sown in pots in the greenhouse early in April. When the seedlings are large enough they are potted off singly into small pots. About the end of May the plants are set out in beds in the garden, where they begin to blossom in the early part of July and continue in flower until frost destroys the plants. This showy plant is a native of the West Indies and tropical America. It has escaped from cultivation in some of the western states, and is also found on waste grounds southward. It is slightly more than three feet high and has prickly stems. The leaves, which are covered with clammy hairs, are of good size and are digitate, made up of five or seven leaflets. Seeds are produced plentifully, and young plants are easily obtained from them. There is a white-flowered form of this plant which is also desirable.

A near relative to *Cleome spinosa* is the native annual, *Polanisia trachysperma*. The plant grows about two feet in height, and is terminated with clusters of white flowers produced in leafy racemes. It has a long blossoming season and produces its flowers most plentifully during the hottest part of summer. It requires the same cultural treatment as *Cleome*.

Verbena venosa is a perennial plant of free-flowering habit, but as it is not quite hardy here it is grown annually from seed. It is more vigorous and not so liable to be destroyed by mildew as the hybrid kinds. Massed in an open, sunny position it is showy when in flower, with bright lilac or bluish blossoms. The branching plants are from one foot to eighteen inches high. Seeds are produced freely. This native of Brazil was introduced from there in 1830. *V. Aubletia* is a native plant not quite hardy here, but we find it well worth the trouble of raising from seed annually. Its showy, abundant reddish purple flowers make a good display during late summer and early fall.

The desirable native annual, *Centaurea Americana*, is seldom seen in gardens in this vicinity, although some of our seedsmen offer it in their lists. It is easily grown from seeds, and if sown in April the plants will blossom in July and August. The erect-growing plants have stout, well-clothed stems which

are terminated by large, showy rose-colored flower-heads measuring four inches in diameter. It is at home on the plains of Arkansas and Louisiana to Arizona.

Harvard Botanic Garden, Cambridge, Mass.

Robert Cameron.

The Cultivation of Dutch Bulbs.

THE time for planting Dutch bulbs has now arrived. The first planting of Roman Hyacinths is already made; they are forced in large quantities by florists, and although rather common during the holiday season, these charming flowers are always favorites.

While Hyacinth culture is easy, there are some constitutional requirements which must be heeded. The Hyacinth is essentially a hardy plant, and cannot be forced quickly into bloom. Between the time of planting and the appearance of leaves there must be a root-forming period. The conditions of pot-culture differ from those in the open ground. In pots the bulb can barely be covered unless very large pots are used, and the consequence is, as many amateurs have found, that the roots in striking earthward become confined and force the bulbs out of the pots. Added pressure will keep them down, and after the pots have had a good watering the surface may be covered with two or three inches of sand or coal-ashes. Our plantings will be kept under the bench of a cold house, mostly for convenience. Cold frames answer as well, but must be well protected by mats and shutters during winter and have a banking of leaves or litter on the outside. We protect the cold frames well so that pots may be taken out at any time during the winter. If the Hyacinths are not wanted until spring a little freezing is beneficial rather than otherwise, providing the sun does not strike them. Roman Hyacinths naturally bloom earlier and force more readily than the show varieties, and therefore do not require so long a rooting period. The show varieties should not be unearthed until the flower-stem shows well among the leaves. In the meantime the plants will probably require one good watering, especially if the ground on which they are set is dry. A good indication in this respect is the drying out of the covering. My bulbs are so placed that I do not find it necessary to water them after potting time. Show varieties come on slowly and they are always better for a good start. Even though apparently drawn they quickly assume their natural green color on exposure to light. It is beneficial to stand the pots in a cool house for a few days before the plants are forced. A shorter and better proportioned flower-spike is obtained when the plants are forced slowly. Really no forcing is required if there is time to wait for the flowers, and they will come along well in a night temperature of forty-five degrees, Fahrenheit. These cultural remarks apply, with scarcely any variation, to all forced Dutch bulbs.

Wellesley, Mass.

T. D. Hatfield.

Russellia juncea.—Though not one of the showiest of our greenhouse plants, this is certainly worthy of a place in every collection. It is specially serviceable where hanging plants are required, and owing to its pendulous habit it can only be shown to advantage in this way. The flowers, which are trumpet-shaped about one inch long and of a brilliant scarlet color, are freely produced nearly all the year through. The numerous long, rush-like, branching stems are clothed with small linear or lanceolate leaves. It is a plant of comparatively easy culture; it can be grown either in pots or baskets, and delights in a light, moderately enriched soil. A house where a night temperature of fifty-five to sixty degrees is maintained during the winter months will suit this plant well. The most convenient method of propagation is by cuttings made from the little branchlets taken off with a heel. These root readily in sand or sandy soil in a propagating-case with gentle bottom-heat.

Tarrytown, N. Y.

William Scott.

Garden Plants in Autumn.—An effective subtropical bed in the flower garden on the estate of H. H. Hunnewell, Esq., is made up with several large plants of *Eucalyptus globulus* for the centre, and these grow twelve feet high. *Grevillea robusta*, Rubber-plants, Cannas with colored foliage, *Acalyphas*, *Alocasias* and *Abutilons* are massed about these, with a circle of *Coleus Verschaffelti* and *Cineraria maritima* for an edging. *Desmodium penduliflorum* makes a good autumn-flowering plant for the herbaceous or shrubbery border. By the graceful way its willowy branches fall away on all sides to the ground I should think it a first-rate plant to use for separate specimens on grassy slopes. Its distinctly Pea-like purplish flowers are borne on short racemes toward the ends of the branches, in the same way as in

our garden *Cytisus*. *Amaranthus caudatus* is a good hardy annual, but, like many other excellent border plants, it would soon become a weed if allowed to spread. Persons seeing this plant for the first time are always impressed with its beauty. It is very effective in the subtropical border, where its purple plumes sometimes grow to the height of six feet.

Wellesley, Mass.

T. D. H.

Correspondence.

Notes from the Ozark Fruit Regions.

Sir,—These notes were mostly made at the Olden Fruit Farm, in Howell County, Missouri, on the southern slope of a spur of the Ozark range and about twenty-five miles from the Arkansas line. But the methods advocated and largely practiced there, while advanced in some respects, are practically the same that obtained throughout the Ozark fruit region.

On so large a fruit farm, comprising 3,000 acres, every department of the work is on a correspondingly large scale. Thus, in the propagation of young stock, peach stones that have not been allowed to heat or sour are sown broadcast in October on the surface of ground that has been fertilized (after having been previously used for the same purpose) by the cultivation of Cow Peas—the so-called salvation of the Ozarks—for one year. The proportion of seed used is from three to four hundred bushels on a space sixty feet square—the seed being literally shoveled onto the ground—and then plowed under to a depth of from two to four inches. These sprout the following spring, coming up as thickly as grass. While the seedlings are very small they are transplanted into nursery rows three and one-half feet apart and about three inches apart in the rows. The following August they are budded, as close to the surface of the ground as it is possible to work, with any variety the grower chooses, and the Elberta is the usual choice, although thoughtful growers begin to doubt the wisdom of the universal cultivation of one variety, no matter how fine, the simultaneous marketing of the great Elberta crop of this year having seriously demoralized prices. The following spring the seedling tops are cut off and the bud nurtured through the season. The next spring, the root then being two years and the bud one year old, the trees are ready to set in orchards, and are considered better for the purpose than when older; indeed, any left after the next spring are rooted out and destroyed.

Peaches are always planted on the highest ground as a protection from late spring frosts, and the best results follow the use of ground that has been cleared of timber and brought under subjection by the cultivation of one or two crops of beans, potatoes, or even corn, though a low crop is considered preferable to corn. But if quick results are wished the stock is set at the rate of one hundred and sixty trees to the acre on new ground that has been cleared of native growth, the wood is burned, the clearing is grub-plowed, the worst of the stumps are picked off and also burned and the soil is harrowed. Corn is then grown in the orchard until the trees are three, and in some instances, four years old, after which, for the best results, the ground is cultivated each year until midsummer; but some growers omit this cultivation to the detriment of the crops. Peach orchards on such virgin soil need no fertilizing for at least ten years, but when new orchards are established on old, worn-out land Cow Peas are used to regenerate the soil, being sown in drills and cultivated. If the ground at any time shows great deterioration the crop is turned under, but usually simply growing and cultivating a crop of Cow Peas is accounted sufficient, and in most cases hogs are turned in to harvest the crop.

Peaches bear at three years and are profitable at from four to six years of age, and the oldest trees at Olden, now fourteen years old, still bear heavily. In a good peach year four-year-old trees will average two bushels each, but ordinarily one bushel is a fair average. The crop is less certain than that of Apples. There have now been three heavy crops in succession in Howell County, and in fourteen years there has been one instance of two successive years of crop failure.

No known case of either Yellows or Rosette has occurred in the Ozark region, and insects are less troublesome than in older orchard countries. Peaches were sprayed this year at Olden for the first time and with satisfactory results. The first spraying was done immediately after the fall of the bloom and was repeated three times at intervals of ten days. A preparation of arsenate of lead made and applied under the direction of Professor Stedman, of the Missouri Experiment Station, was used on every alternate five rows throughout a forty-acre orchard, which thoroughly disposed of the tent-

caterpillar and gouger and greatly lessened the ravages of the curculio, while it in no wise injured the foliage. The preparation is to have further trial before the formula is made public.

Brighton, Ill.

Fanny Copley Seavey.

Fruit-trees in Arkansas.

To the Editor of GARDEN AND FOREST:

Sir,—As the summer season in north-western Arkansas is somewhat longer than in Massachusetts, a greater growth of the Burbank Plum is made here than that reported by your correspondent from Massachusetts on page 347.

In April, 1895, I set out a small-sized Burbank Plum, and it now measures ten feet in height. Last spring the branches were cut back to eight inches, and it has grown a little over four feet this season. All fruit-trees grow rapidly here. A small yearling Peach-tree transplanted in the spring of 1895, when the top was cut off at the root, is now fourteen feet high and ten inches in diameter. This year it was heavily loaded with fruit. An Elberta Peach-tree budded a year ago is eight feet high and is still growing. A Gibb Apricot has grown six feet this season. The entire top of an Early York Nectarine was broken off last winter; a sprout started near the ground, and now measures five inches in circumference and is five feet high. Several dwarf Pear-trees have grown five feet this year, and a Kieffer six feet.

Trees bear when very young, and it is no uncommon thing for a tree five years old to bear a bushel of apples, and for Peach-trees to bear moderately when two years old.

Decatur, Ark.

A. R. Plank.

The Marsh at Rose Brake.

To the Editor of GARDEN AND FOREST:

Sir,—September, in this part of the country, is usually a dry month. The roads are hot and dusty, the garden has a discouraged air, the leaves are limp and withered, and the flowers hang drooping from their stalks. The only fresh and verdant spots are the banks of streams and the moist places of the farm where the springs well-up from the limestone rocks underground.

One of the attractions of Rose Brake is its acres of unrequited marshy ground, which we have made a present to Nature, and over which she holds undisputed sway. Here beauty revels in these September days in a riot of color and bold and picturesque effects. Through beds of Mint and Moss and many gay blossoms now in their prime, winds a stream which is fed by many springs. This is the wild-flower garden that far outrivals our poor attempts at cultivated borders on dry and rocky hillsides, which are only successful in spring and early summer. It is to the marsh that we go with shears and baskets now to garner some of this lavish harvest of bloom for the decoration of home and little church.

Various are the surprises here. In one place the stream runs between beds of a low-growing showy yellow flower, the common *Bidens chrysanthemoides*, first cousin of the hateful Spanish Needles, but which makes here a beautiful picture of dewy freshness by its lavish display of bright golden blossoms set in greenest grass. Then there are large patches of the crushed-raspberry-colored Joe-Pye Weed, with fringes of a white species of *Eupatorium* to give variety. In another place a rank growth of Golden-rod and Yellow Cone-flowers is mingled with the reddish purple of Iron Weed and Marsh Thistles six feet in height, of the same reddish hue. Here are flowers, not in small, primly-ordered borders, but in masses of bright colors acres in extent, harmoniously arranged and blended by the master-hand of Nature. Here are no conflicting hues, no stiff monstrosities, no double Sunflowers and Dahlias, and China Asters and screaming Zinnias whose colors set one's teeth on edge, all in a meaningless jumble, without form and void of beauty, such as one sees in the gardens hereabouts. The effect of our bright marsh garden is toned down by its quiet setting in wild shrubbery, which includes seven species of Willow, and Wild Roses, Viburnums, Thorns, Sycamores and many other plants. Here, too, the Bittersweet and Honeysuckle escaped from cultivation, and the native wild Grapes festoon at will the growth on the banks of the stream, and huge rocks elbowing each other form gloomy recesses where Ferns and Mosses love to hide and birds to build their nests. Tall, rank Sedges and Grasses gone to seed mingle effectively with the brighter coloring of the flowers.

In one place I noticed a patch several yards in circumference of *Cuphea viscosissima*, an insignificant little plant as usually seen in dry soils, but here in the rich muck and bloom-

ing lavishly, it makes an effective patch of a rather pleasing light magenta color, contrasting not unfavorably with some neighboring clumps of *Coreopsis* and *Chrysopsis Mariana*. In some places the Jewel-weed is unusually rank and tall and free-flowering, and large clumps of it, studded with bright orange-colored blossoms, are framed in a setting of blue *Ageratum*.

In a damp corner of a pasture-field we find a thriving colony of the lovely blue *Lobelia syphilitica*. No other flowers are near by to mar the effect of the bright blossoms growing out of the fresh Mint and Grass, and it is a delight to sit upon a mossy stone and revel in the blue and green surrounding one in perfect accord with the clear blue of the sky and the tender green of the Honey Locust trees that overhang the spot. From this point of vantage we survey the extent of the marsh and take in all its beauty and are glad.

Rose Brake, W. Va.

Danske Dandridge.

Native Plants for Ornamental Planting.

To the Editor of GARDEN AND FOREST:

Sir,—Your recent editorials recommending the use of native local plants for the ornamentation of small country places ought to open many eyes to the variety of the examples offered by Nature's products, not merely in the meadow and by the brookside, but even along the high road, where conditions of growth are usually less favorable. For example, I noticed recently by a country roadside in this part of southern New York, an "arrangement" of Nature's making which might well be imitated by a planter of taste, and which could not easily be rivaled by any created with exotic garden shrubs and creepers.

Between a sloping hillside and the road, sweeping downward to a border of Grass just as one might desire it to do in ornamental grounds, ran a long narrow clump of Sumachs. Their handsome dark red panicles were at their best. The deep green of their foliage was varied by the beautifully lobed leaves of our most beautiful wild Vine, *Vitis æstivalis*, while its stems were hidden from view. And over all, not as a thick covering, but in sparse, graceful tendrils, ran lengths of the Virgin's Bower, bearing charming clusters of starry white flowers. This was only one of the striking instances of beautiful "arrangements" casually produced with native plants which I noticed in the course of a single afternoon's drive; but it is enough to show that no one need depend for variety of effect, any more than for beauty, upon the resources of the gardener. Perhaps in two or three years this particular bit of Nature's planting will have lost its beauty. Very likely the Vine and the Clematis will have strangled the Sumachs—I mean, will have overrun them with heavy masses of their own foliage so that the artistic-seeming arrangement of to-day will become a somewhat formless tangle in which the individual charm of the component parts will be lost. But this is just where man has the advantage of Nature. In the pleasure-ground discreet pruning or uprooting might keep such an arrangement perfect for many years, while Nature, bent upon growing as many plants as she can as fast as she can, cannot pause to preserve special effects of peculiar beauty.

Tuxedo Park, N. Y.

M. G. Van Rensselaer.

The Jewel-weed for Cutting.

To the Editor of GARDEN AND FOREST:

Sir,—In your issue of GARDEN AND FOREST for August 18th, in the article on the August wild flowers, it is said that the lovely Jewel-weeds, *Impatiens pallida* and *I. fulva*, are useless for house decoration, and this is almost true. However, after repeatedly hurrying it into the house and into water, and failing to save them, I carried the water to the flower. By gathering the graceful sprays early in the day or very late, or on a cloudy day, and by cutting the stems off immediately a second time under the water, I have succeeded in having fresh Jewel-weed in the house.

Stowe, Vt.

Ellen E. Learned.

Recent Publications.

Familiar Features of the Roadside: The Flowers, Shrubs, Birds and Insects. By F. Schuyler Mathews. With one hundred and sixty drawings by the author, and many of the songs of our common birds and insects. New York, D. Appleton and Co. 1897.

Books about Nature in her more familiar moods, as distinct from books of travel and descriptions of scenery, have

in recent years become more and more numerous. And the wide welcome accorded them proves a growing interest in our public as regards a knowledge of Nature's products, animate and inanimate. The two classes into which such books naturally fall—the æsthetic and the scientific—seem to be equally popular, while the more exceptional works which unite real information of a scientific kind with a really adequate and personal interpretation of Nature's beauty and charm, are deservedly the most warmly welcomed of all.

Of course this evident demand for books which enlarge the perceptions, broaden the knowledge, and deepen the feelings of the average reader who is neither a trained artist nor a professed student of science, has brought forth many works which fall below the level of real utility. And, unfortunately, the book now under review must be ranked among these. It contains many scientific facts of more or less value and interest, and many expressions of pleasure in natural beauty. But the facts are so ill-arranged and for the most part so inadequately explained, that the reader will hardly close the book feeling that his knowledge is much enlarged. And the endeavor to interpret beauty seems to have been almost wholly futile and, in certain ways, actually misleading.

One great fault in this book is that it lacks consistency of plan. If it showed the familiar features, animate and inanimate, of our roadsides, in any systematic way whatever it would have a genuine claim to praise. But it does not confine itself to any special locality nor, on the other hand, does it draw comparisons between different localities. Various parts of our eastern states are referred to on various pages, but no clear picture of any is presented, and most of the geographical references will leave the reader in doubt whether or no the plant in question is narrowly confined to the indicated district, environment, or spot. Again, while some attempt is made to follow the procession of the seasons, it is not systematically carried out. After a chapter on Early Wild Flowers and one on Early Flowering Shrubs we are not told about those of the following weeks—we are jumped into two chapters on Shrubs Belonging to the Rose Family; and the subsequent ones are as heterogeneously arranged. Moreover, heterogeneous material is intruded into some of the chapters in a way which must perplex any reader devoid of botanical knowledge. For example, in one of the chapters on the Rose Family a paragraph about plants which furnish food for birds is inserted, and no indication is given that they do not belong to the Rose Family except by the mention of their scientific names, and this will not make the fact plain to an unlearned reader.

It should be understood that this is distinctly a book for beginners, not for those who have made even the first steps in botanical knowledge. Therefore such faults and failings as we have pointed out seem to us radical. The only way to show a beginner that nature is interesting, and that the study of its products means something more than a memorizing of Latin names, is to group facts in some sort of logical sequence. We do not say that Mr. Mathews has not attempted this in the volume before us, but he has certainly not attained it. Nor are his facts always as clearly and accurately put as they should be in an elementary work. To say that *Cornus florida* "bears a large flower with four notched, petal-like, showy white leaflets set around the tiny greenish florets," cannot convey any definite idea to an uninstructed reader. It seems extraordinary that if it was felt needful to indicate that this "flower" is unlike ordinary flowers, it did not seem essential to explain its structure correctly, especially as such an explanation might have been made perfectly clear and extremely interesting to the least patient eye. Again, if it was worth while to mention that the Indian Pipe is "odd" it was surely worth while to explain its oddity better than by saying it has a "frail, fleshy, single flower." And defects of a more fundamental kind are indicated by the fact that while Mr. Mathews devotes a

chapter to Shrubs and Flowers Belonging to the Heath Family he gives no slightest indication of why these plants are grouped together in one family. Not interest but discouragement, not a belief in the reasonableness but a strong suspicion of the unmotivated wilfulness of scientific classifications, must be awakened in the novice who is conducted from the *Rhododendron* and *Mountain Laurel* to the *Pipsissewa* and the *Indian Pipe* without any hint in regard to the basis of the classification which brackets them together.

Mr. Mathews's treatment of birds and insects may be left for appraisement in other pages than these. But here a word must be said about his point of view as regards natural beauty. His remarks upon this subject are most often in praise of a phase of art which he calls "impressionism" and of the high intelligence of the "impressionist." These terms are not explained. It is not even implied that impressionism is a modern phase of art which, like all others, may be attempted by foolish or feeble as well as by capable artists. We are told, as the concluding lesson of the book that "The impressionist has in his possession the key to Nature's mysteries of color," and on another page that "the commonest weed by the roadside becomes one of the most beautiful things in the world when the strength of its color is portrayed on the impressionist's canvas." Surely, there were kings before Agamemnon; and as surely every one with a paint-box who calls himself Agamemnon does not deserve the name. Of course Mr. Mathews knows this, but in a book for beginners it is well to make such things plain; and it is also well to give some interpretation of terms not generally understood, and not very concordantly defined even by those who think they understand them. It is altogether a matter of speculation what the author understands by the word æsthetic as used in a sentence, describing the *Joe-Pye Weed*, which runs: "This is rather an aspiring weed, which furnishes the lowland landscape in summer with the most consummately æsthetic pink tone which it is possible to imagine. (The *Joe-Pye Weed*, we may note, is more aspiring than the limiting word "rather" would lead one to suspect, and it grows in other localities as well as in the lowlands.) Again, we are told that "the splendid color of the October landscape is æsthetic" while "that of snakes, butterflies, beetles, birds, and flowers is beautiful only as far as it is brilliant, or pure, or variegated." Such statements as this must confuse the beginner in the art of appreciating beauty quite as much as Mr. Mathews's lack of clearness in scientific definition must confuse him with regard to the science of classification. Nor can much that is inspiring be gathered from the descriptions of an author who permits himself to speak of the "even yellow" of the *Sugar Maple* in autumn and the "sober scarlet" of the *Red Maple*; who mentions several times the "neutral gray-buff of the road," not noting that roads differ almost as much in color as green leaves; who has such curious ideas in regard to what may be called the terminology of sizes that he describes the "tiny" blossoms of the *Yellow Hop Clover* as "scarcely larger than one's thumb nail"; who says that the color of the *Rhodora* is "too near the unpopular magenta to make it a favorite with anybody but an enthusiastic poet," and on another page declares that the immature fruit-clusters of the *Dwarf Blueberry* "are of the most beautiful æsthetic hues: green, magenta, pink, purple and violet." The mention of the *Rhodora*, by the way, offers an opportunity to illustrate what we meant by saying that Mr. Mathews's geographical indications may easily mislead. He remarks that the *Rhodora* "is readily found in the vicinity of Concord and Lexington, Massachusetts," and that "it is also seen in cultivation in the Arnold Arboretum near Boston, and the Harvard Botanic Garden, Cambridge." A beginner might well be discouraged by these words from looking for the *Rhodora* anywhere else; and indications of this seemingly exclusive kind are very frequent in Mr. Mathews's book.

Some of his little drawings of plants are good; others,

like the picture of an *Hepatica*, do not give a true idea of the plant. His drawings of birds lack character and delicacy; and the many landscape views are far below the average to which the eye of the public has grown accustomed in the pages of our illustrated magazines.

Notes.

Miss Maria Audubon is translating from the French for publication the hitherto unpublished journals of her distinguished grandfather.

Among seasonable vegetables are cranberry-beans, the large rose-colored pods enclosing fleshy white beans splashed with pink. These sell for forty cents a half-peck. Tomatoes of perfect form and color and of high quality with respect to texture and flavor, are coming from the vicinity of Chicago. These are the choicest offering of this vegetable in the New York markets now, and bring fifteen cents a quart.

Limes from the West Indies are among select fruits now in season, and occasionally a bunch of red bananas is seen; the latter cost sixty cents a dozen, a price considerably in advance of that asked for the best yellow bananas. Owing to the effect of the war in Cuba on trade with that island none of this red fruit has been seen in our markets during the past year, and a cargo of many thousand bunches of yellow bananas from ports in Central America may include only one or two bunches of the red fruit. Among other imported fruits are Alligator pears, from Venezuela; these sell for twenty-five cents each. The large, smooth, oval fruits known as Spanish melons in the trade and which come from Italy, find a limited demand at fifty cents apiece.

In an account of the present condition of the artificial silk industry in the *Revue Industrielle* it is stated that patents have quite recently been taken out by Dr. Lehner, of Switzerland, for the manufacture of an artificial silk made with wood-cellulose, or, more simply, with sawdust. This product is, however, highly inflammable and more costly than real silk, so that there is opportunity for improvement in the new industry in the way of economy and safety. Among other substitutes for genuine silk is mentioned a cotton fibre treated so as to have the lustre of silk by a process patented by Monsieur Oswald Seyfert. This Seyfert cotton is said to be on the market in competition with other artificial silks, and at a fairly reasonable price.

Hardy Bamboos are beautiful in the Royal Gardens at Kew at this time, and every year seems to reveal new attractions in habit, sheath, curve of culm, etc. In writing of these Bamboos, Mr. Watson says they do not flower, or if they do so much the worse for them, but they have variety enough to be of perennial interest without flowers. They have to be watched to prevent their outrunning the space allotted to them, but in almost every one of the numerous species grown at Kew there is a vigor and persistency of growth shown which suggests much usefulness in the large garden and park, particularly in the neighborhood of water. They are not known yet, and those who know least about them are apt to decry their merits. But they are essentially plants for general use. Two new species have lately been added by Mr. Freeman-Mitford, namely, *Arundinaria metallica*, which is intermediate between *A. Veitchii* and *A. humilis*, and *Phyllostachys fulva*, a near ally of *P. nigra*. These are both from Japan.

In a recent article in which reference is made to the influence of forests on farming, the *Boston Transcript* says that soil, moisture and heat are the three servants of the farmer. The soil he can regulate by culture and fertilizers, but moisture and heat seem out of his control. These are not out of the control of the woods, however, and the farmer by judicious management of his tree-plot can bend them to his ends. He can prevent or temper the effects of atmospheric changes, he can avoid the disasters of excessive rainfall, and he can manage the water to his own benefit. It is explained that the snows of winter are conserved by the shade of the trees and do not rush away at the earliest moment of sunshine to swell the spring freshets; the loose soil of the woods, not hardened by the impact of the raindrops, holds the water and lets it percolate to the springs below; the tree-covered area catches more of the snow, and the shaded surface does not give up its moisture in evaporation; there is more water there and means are present to prevent its waste so that the subsoil distribution is better and stronger, and it is the subsoil waters that are the farmer's standby in case of need.

The first Japanese persimmons of this season, from Florida, are now seen in choice collections of fruit, and cost fifty cents a dozen. Grape-fruits are another novelty just received from the same state, and sell for \$2.00 a dozen. Bartlett pears of the largest size are showy yet, although their rich yellow color lacks the bright marking of the smaller fruits seen earlier in the season. These sell for from sixty to seventy-five cents a dozen in the fancy-fruit stores, together with selected specimens of Duchesse d'Angouleme. Seckel pears, from the Hudson River district, are in demand for their rich, spicy flavor, and the best cost twenty cents a dozen. Even the most ordinary fruits are arranged with taste and displayed to the best advantage, and three-pound baskets of Concord grapes are made up of short sections of the vine with two or three bunches of the fruit attached. Crawford peaches of immense size are seen in the best markets, which have been cut from the tree with a bit of the branch and a leaf or two, and a basket holding twenty-four of these handsome fruits sells for \$1.25. The first Cornichon grapes, from California, sell for fifty cents in five-pound packages. It is surprising to see huckleberries shown so late in autumn, and after cranberries are regularly in season.

Stockbridge, Massachusetts, claims to have been the pioneer in the organization of the Village Improvement Societies now existing in many states, and the work of the Stockbridge Society, which is called the Laurel Hill Association, has steadily broadened out. It now has district committees to care for the different sections of the town, and also special committees charged with the supervision and improvement of parks, squares, street sprinkling, street lights, the removal of snow, the care of cemeteries and other special matters. One of its members has recently suggested a combination between all similar societies in Berkshire County, or, if possible, in a still wider area, to work for rural improvements and for the preservation for public enjoyment of places of great natural beauty or historic interest. Of course, efforts toward the latter end have already been made in many localities, but the combination of small local bodies would further this good movement and awaken popular interest in it. Such coöperation would tend to effect, along deserted farm fronts in the country, tree-planting, weed-cutting and the making and preserving of openings through brush or trees for a passing sight of beautiful scenery. As has been said by one of the members, it would mean good roads everywhere, tidiness in the villages, the doing away with flaming circus posters and patent medicine advertisements. After a time no farmer would build his unsightly barns across the road from his house, or put his cattle-shed between his windows and a beautiful landscape. Ugliness and neglect would be looked after between the towns, a common recreation-ground would be established and a reservation of the most wild and beautiful spots would be effected.

Concerning local adaptability of varieties to certain soils and climatic conditions, T. V. Munson, in a recent number of *The Rural New-Yorker*, states that adaptability or non-adaptability applies more to the species than to cultivated varieties. As an example Mr. Munson cites the fact that not one or a few varieties of the Muscadine species of Grapes, but all the vines of this species, succeed well in good soils in the south, but never in the north. All Mustang Grapes do well in almost all soils and situations in the dry south-west, but fail entirely in the cold, damp north-east; no other species is so generally successful in Texas. But on all upland, sandy soils, known as Post-Oak lands, the Post-Oak Grape, *Vitis Lincecumii*, succeeds perfectly if in well-drained soil, but fails in seepy and bottom lands. Vinitera varieties almost always suffer in all the southern states east of the one-hundredth meridian with mildew and rot in foliage and fruit, as well as with phylloxera at the roots, showing clearly that the species is a native of very arid regions, where these diseases do not exist, and agreeing with the accredited habitat of the species as being in the arid regions of Persia and other central southern Asiatic regions. The native Grapes of Arizona invariably suffer severely from mildew and rot when moved into the Mississippi valley. In black, waxy, very limy lands in Texas the *Labrusca* class of Grapes almost always fail, and do poorly anywhere in the interior south-west; their inability to endure appears to be in their having masses of fine surface roots, and no ability to push deeply into the soil, as do the southern species. In New York varieties of no other species succeed better than those of *Labrusca*. Examples of local adaptability are given also of other fruits and of vegetables and trees, and it has been Mr. Munson's experience that if species which do best in a peculiar soil and climate are taken to a different locality and new varieties are grown there, these new varieties will do better in the climate and soil where their parents came from.

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The Forests of Alaska.

THE great maritime forest of north-western North America, which at the south embraces the Redwoods of California and spreads over western Oregon and Washington, terminates on the Alaskan coast on the eastern shores of Kadiak Island, just below the fifty-eighth degree of north latitude. Taken as a whole, this coniferous forest is unequalled in productiveness and in the size, beauty and value of its trees. Not only is the Redwood the largest of all conifers, with the single exception of its relative of the Sierras, which excels it in bulk of stem and branches, but not in height, but in this maritime forest are found the largest Spruce-tree and the largest Hemlock in the whole world. Of the *Arbor-vitæ* here grows the giant of its race; and of all the Cypress tribe none can equal Lawson's Cypress in majesty of port. Here, too, the Alder becomes a great tree, and Firs assume their noblest proportions.

To-day, however, we would speak more particularly of that part of this forest covering the coast mountains of south-eastern Alaska, and which in many of its general features resembles the forests of Puget Sound and of western British Columbia, although the Douglas Spruce, the most abundant tree on the shores of Puget Sound and Vancouver Island where it surpasses all its associates in height and in size of stem, does not reach Alaska. The White Fir (*Abies grandis*), which is so conspicuous with its tall pyramids of lustrous dark green foliage on the shores of the Gulf of Georgia, is absent, too, from the Alaska forest, as is the Great-leaved Maple (*Acer macrophyllum*), abundant in all the coast region further south. The *Arbor-vitæ* (*Thuja gigantea*), which is common and of fine size on Prince of Wales Island and on the southern part of the Cleveland Peninsula, is rare, if it exists at all north of latitude fifty-six; and the coast forest of south-eastern Alaska is composed almost entirely of two trees, the Sitka Spruce (*Picea Sitchensis*) and Merten's Hemlock (*Tsuga Mertensiana*). From the edge of tidewater these two trees grow up to the timber line, which varies in elevation from 2,500 to 4,000 feet, every where in dense, serried masses, like the blades of grass in a meadow, covering all islands and the seaward slopes of the mainland mountains, which shut off the moisture from the dry interior. Sometimes the Spruces pre-

dominate, especially toward the north; sometimes the Hemlocks are more abundant, and often the two are mixed in nearly equal numbers. Through this forest the Sitka Cypress (*Cupressus Nootkatensis*) is scattered, usually at elevations of about 1,000 feet above the sea-level, although it often descends to the water's edge. It grows not in large bodies, but often in numbers sufficient to enliven the sombre Spruces and Hemlocks with the cheerful yellow tints of the graceful frond-like branchlets which descend from the wide-spreading branches of this splendid tree, unrivaled by any other American conifer in the beauty and value of its wood. On the margins of the little flats and beaches which occur only at the mouths of streams—for on the Alaska coast the mountains usually rise abruptly from the sea—Alders of two kinds and the lovely Sitka Willow light the borders of the forest; and Alders sometimes extend up the banks of streams or hang over rocky sea-cliffs. On sloping seashore bogs, rich in mosses and studded with many charming herbs and dwarf shrubs, *Pinus contorta*, the only Alaskan Pine, occurs rather sparingly; and on Baranof Island, near the town of Sitka, Patton's Spruce (*Tsuga Pattoni*), which is probably widely distributed over the coast mountains at high altitudes, descends with a few small individuals nearly to the sea-level. These, with the addition of the Balsam Poplar, which is only seen near streams, and the little Rocky Mountain Maple (*Acer glabrum*) are the only trees of the coast forest of south-eastern Alaska, which is remarkable in its poverty of species, in its richness in individuals, and in the size these attain in the thin soil, a few inches deep at best, and often on the nearly perpendicular slopes of these glacier-swept hills. They are wonderful, too, in the deep mosses of the forest floor, and in their impenetrable undergrowth of Blue-berries of many varieties, Salmon-berries, *Menziesias*, and the terrible Devil's Club (*Panax horrida*), which so cover the ground with their entangled stems that travel through the woods is practically impossible.

As compared with trees in forests further south, those of Alaska are not large, although Spruces and Hemlocks a hundred and fifty feet high, with trunks three or four feet in diameter, are not rare at the sea-level as far north as Baranof Island; ascending from the shore, however, the trees rapidly decrease in size and near the timber-line become small and stunted, as they often do at the sea-level at the heads of the numerous estuaries and fiords cut deeply into the mainland coast range.

The deepest and most interesting of these fiords, the Lynn Canal, a narrow continuation of Chatham Strait, extends a hundred miles northward from the coast nearly to the sixtieth degree, and at its head is fed by the waters of the Chilkat, the Chilkoot and the Skagway rivers, swift mountain streams, which afford difficult passage across low passes into the interior to the headwaters of the great western tributary of the Yukon. The forests at the head of the Lynn Canal differ somewhat from those in the region nearer the coast. The narrow bottom-lands are covered with masses of Balsam Poplar or with the so-called Green Alder, which here becomes a tree fifty feet high. The Spruce is still abundant at the river-level and on the lower slopes, but it is everywhere small and stunted. The Hemlock also occurs here, but only sparingly, and not of large size. The Pine is seen on the flats and at considerable elevation on the hillsides, but here its leaves are broader than those of the coast trees, and it is passing into the variety *Murrayana* of the interior plateau, the Lodge-pole Pine of our northern Rocky Mountains. A White Birch is very common at low elevations, and is more like the Birches of Siberia and northern Japan than any described American species, and growing with it is *Acer glabrum*, which is certainly the most widely distributed of all the North American Maples, and probably the most boreal member of the genus, and Patton's Spruce is at the timber line.

When these passes from the humid coast region to the dry interior are crossed an entirely different forest is encountered. The Hemlock and the Sitka Spruce have dis-

appeared, and the largest tree in the open scattered groves near the shores of Lake Bennett and Lake Linderman is a Fir (*Abies lasiocarpa*). With it grow stunted White Spruces (*Picea alba*), which in greater or lesser abundance and mingled with Balsam Poplars, Birches and Alders are scattered over the basins of the Yukon and its tributaries for hundreds of miles, and finally reach the Pacific coast on Kotzebue Sound within the Arctic Circle, and nearly five degrees north of Kadiak Island, where the forests of south-eastern Alaska give way to a growth of Grasses and low Alders and Willows.

Trees cannot be cut lawfully in Alaska for timber or fuel, for there is no law which permits the sales of stumpage or timber-lands, and no law relating in any way to the forest but the one which forbids all shipment of wood from the territory. There are a few sawmills in Alaska, however, and the number will soon be increased, and a large quantity of fire-wood is consumed at the salmon canneries and quartz mines, but the Government gets nothing for it, and is powerless to prevent damage to the public domain. Fortunately, the climate of south-eastern Alaska is so humid that forest fires are rare, and never very destructive, and reproduction is sure and rapid. These forests, therefore, even with American methods, will not soon or easily be destroyed; and here and to the southward along the coast ranges and islands of British Columbia through nine degrees of latitude from Cross Sound, at the north of Chicago Island, to the Straits of Fuca is now the greatest continuous body of coniferous timber in the world, almost unmarked as yet by the axe, safe from fire and of easy access, from which the world will be able to draw great stores of material when the Redwoods and Douglas Spruces of the south have fallen, and our south-Atlantic and Gulf-shore pineries are only dim memories.

Pollen-bearing vs. Plant Vigor.

IN GARDEN AND FOREST, vol. x., page 38, an article with the above title recorded some experiments made at Cornell University during 1895-6. Other researches and tests have since been brought to a close and have thrown some further light upon the subject.

The idea that pollen production is more or less an exhaustive process has gained many adherents who maintain that, because, in animals, differences favorable to man appear after the operations of spaying and castration, it therefore follows that, in plants, similar results will also appear if the plants do not have to produce both pollen and seed or fruit. In proof of this theory the favorite example cited is the case of the Strawberry, in which it is claimed, and apparently with justice, that the pistillate varieties are more productive than the so-called staminate or hermaphrodites, which, in addition to the production of fruit, also produce pollen. And this fact is considered sufficient to account for the lightness of the crop borne by the staminate varieties. But, as will be seen later, it is just as probable that the unproductiveness of these hermaphrodites is the result of the theory they are now cited as examples to prove.

Pollen production undoubtedly does demand much of the plant's energy since it has been ascertained by analysis that this substance compares in complexity of composition with the seed. De Planta, Przybytek, Famintzin and Snyder have found the following substances in various kinds of pollen: Water, globulin, peptone, guanin, hypoxanthin, amides, saccharose, starch, fatty acids, cholestrine, resinous and waxy substances, coloring matters, potash, magnesium, calcium, phosphorus, sulphur, chlorine, iron, aluminium and manganese in varying quantities. Snyder's analyses of corn anthers after the shedding of the pollen, show much the same substances to be present in these empty husks. It is, therefore, easy to believe that large quantities of plant-food are required to produce these parts. Snyder remarks that if we allow "corn to be planted three feet six inches apart each way, and three stalks to the hill"

there would be 6.01 pounds of nitrogen alone per acre, "which makes the loss of nitrogen to the plant very considerable, equal to a very liberal application of nitrogen in the form of commercial fertilizers." But is this, strictly speaking, a loss? Has not the plant made provision for this apparent waste? These are questions that the experiments were conducted to test.

The primary office of pollen is to fertilize the ovules for the perpetuation of the species by seed. Since this fertilization depends upon such precarious agents as insects and the wind, plants which tended to produce even slightly more pollen than their fellows stood just that much better chance of perpetuating their characters—of having offspring. Allow this accidental trait to be perpetuated and augmented by heredity and the production of pollen becomes in time, as in the case of staminate dioecious plants, apparently the sole object of its existence. But in countless cases pollen is borne by the individual which also bears the fruit apparently without lessening the production of the latter, and even though the proportion of pollen approaches the highest figures of the dioecious males. Instances are recorded of Pine pollen being swept in quantity from the decks of vessels out of sight of land, and, again, of the beaches of our inland lakes and streams being yellowed by it. After many careful computations upon corn ovules and pollen grains, a writer finds that "allowing two ears of one thousand kernels each, to each plant (a very high estimate) there are still nine thousand pollen grains for every ovule to be fertilized." Darwin also records some interesting figures upon this point in his *Cross and Self-fertilization*.

The apparently great waste of energy in Corn-pollen production led to the apparently common practice in the last century of detasseling. This is recorded in *The New England Farmer*, 1797. Detasseling experiments have been tried at several of the experiment stations with contradictory results. In brief, it may be said that when the tassel was removed just as it appeared and before it had any chance to develop its pollen, there was sometimes a gain in the crop, but that when it was removed after the pollen began to shed there was no such gain.

Concerning the Strawberry so much has been said and written apparently without carefully conducted experiments, and by persons of more or less biased opinion, that the greater productivity of the pistillate varieties seems to be due to their sex, and even though the statements might be proved false, years would have to elapse before the popular mind could be shaken in its belief. After a careful compilation of all apparently reliable data obtainable from the various experiment-station reports and bulletins, it must be confessed that the pistillate varieties average higher than the staminate. This is found to be true no matter by what method the productiveness is judged, popular estimation, the scale of ten, weight or volume of crop, or of a certain number of berries. In only a very few instances do the individual staminate exceed the pistillates. These varieties are all of recent introduction. This excess never appears when a large number of each class are compared and calculated upon. Everything seems to warrant popular opinion. But it is believed that ever since Keens in England, and Longworth in America, impressed upon the horticultural public the importance of mixing hermaphrodite plants with the pistillate varieties to make the latter more productive, the staminate sorts have not had their due. The fact that the pistillates were productive when in proximity to the staminate was only a step to the theory that they were, per se, more productive, and that the ideal Strawberry must be a pistillate. It is true that the greater number of our more productive market sorts are pistillate, but it is interesting to note that the recently introduced staminate are close upon them. One reason that the staminate average so low is that a larger number of the old staminate varieties are retained than is the case with the pistillates, which are kept upon the move, so to speak. It is also true in this connection that the older

sorts in point of time have had greater chance to vary and deteriorate from their original type, due to differences in soil, culture and, as much as anything, to the different ideals of various growers. For example, the old Wilson as it originated probably does not now exist, if we may judge from the fact that of a number of samples of Wilson sent to Cornell Experiment Station a few seasons since, no two were enough alike to be called by one varietal name. It seems manifestly unfair to compare the old, run-out sorts, although bearing the original name and tracing their genealogy back to the original plant, with new, undeteriorated kinds. A comparison of old and new pistillate varieties reveals as great a range of productiveness as is found among the staminate. Hence the two classes should not be contrasted in the popular, unscientific manner since there is, after all these years of biased selection, no just basis for comparison.

In the experiments conducted at Cornell University all the plants were of as uniform development as possible, and in the cases where the plants were grown from cuttings, these were taken from individual specimens so as to reduce the factor of individuality to a minimum. The subjects were divided into three groups, as in 1896, the first blossoming naturally, the second suffering from emasculation in each alternate blossom, and the third being castrated in every flower.

The only annual which gave any results this season was the Alonzoa. The formation of its blossoms and its early and profuse flowering make it an exceptionally good subject to operate upon. The flowers may be opened and the stamens removed without injuring the development of the corolla. As with the Clarkia in 1896, the plants whose flowers were exsected produced several times more flowers and were more robust and vigorous than the non-exsected, while the "half-and-half" group was intermediate. Although practically even at the start, the exsected group had at the close a bushy development of axillary shoots which were covered with scores of tiny flower-buds. The natural group had hardly any of these side-shoots. It seems safe to conclude that Clarkia and Alonzoa find pollen-bearing an exhaustive process, and from these two cases we might further suppose that plants having a long period of bloom might show the effects of pollen production, while species with shorter blooming periods might, and probably would, show no effect at all.

Geranium and Nasturtium were the only cutting-grown plants which proved at all satisfactory. In each case the conclusions were much the same as given above. Nasturtium is a very useful subject since its stamens may be removed in a bunch with little danger of injuring the flower.

To summarize: Whether this production of pollen is the exhaustive process it seems to be, has yet to be proved. If it is exhaustive, it is reasonable to suppose that plants like the Corn, the Pine and others of their class would tend to reduce the amount of pollen produced and would expend their energies in other directions. On the other hand, it seems evident that the Strawberry has either found this process exhaustive and has thus tended to develop unisexual varieties, or that the increasing popularity of pistillate sorts as crop producers, which has presumably sprung from a misconception of the relative merits of the two classes, has led to biased care in selection—selection which has constantly tended to reduce the number of good staminate varieties at the same time augmenting the number and the attributes of the pistillates.

Again, if pollen production is exhaustive, it seems probable, as was stated above, that plants which have a long period of bloom would show the claimed evil effects very decidedly, whereas plants which blossom during only a short period and produce only a few flowers, would not show them. In other words, the minimum of evil should go with the minimum of blossoming both in time and quantity, and the maximum of depletion with the maximum of flowering. It is altogether probable, however, that if the process is depletive, it has been, is being, and will be

answered by each species for itself, so that it will at no time exceed the plant's powers. By the law of natural selection, that species which would perpetuate itself must conserve all its force or become extinct.

Dept. of Agriculture, Washington, D. C.

M. G. Kains.

Baron Von Mueller's Services to California.

MANY times since the death of Baron Ferdinand Von Mueller, the Australian botanist, I have regretted that his friends and correspondents in California did not long ago make some public and especial acknowledgment of his great services. It is true that these services were widely appreciated, and that he often received evidences of the affection he inspired, but the fact remains that his work for California was so remarkable that it deserves public recognition. If state legislatures were sensible of such benefits as Baron Von Mueller rendered this state they would take pleasure in passing resolutions to show their appreciation of this and similar services.

My own correspondence with this lovable man commenced more than twenty years ago, and continued at intervals until his death. In this correspondence the benefits were chiefly on one side, for the few notes upon plant-life that I could offer and the small collections of Pacific coast seeds that I occasionally sent him were unworthy of comparison with his lavish and thoughtful gifts. It was plain that he loved with all his heart to extend the culture of trees and plants and that he took a personal interest in each correspondent. It seemed, too, that he had acquired much knowledge of our California conditions, and felt himself responsible in some degree for the horticultural development of our state. In the course of a wide correspondence with botanists, collectors and various officials in different parts of the world, I may say that I have never met any person who was more unselfishly interested in the work of plant distribution.

Baron Von Mueller's interest in California matters led him to carry on a correspondence with several hundred of our leading florists, gardeners, nurserymen, collectors and amateur horticulturists. This correspondence extended through so many years and his letters were so invariably accompanied by packets of seeds that trees and plants from his distribution are now to be found in every part of California. Wherever one sees a plant which is not generally known he is likely to find, upon inquiry, that the seed came from Baron Von Mueller.

It would, of course, be expected that our older collections of Eucalypts and Acacias were largely created through his coöperation, but it is a surprise to find that he not only gave California its oldest specimens of leading Australian species, but that we received from him many species from south Africa, India and other parts of the world where he had correspondents. Under his management the Melbourne Botanic Garden became a kind of international clearing-house for the rarest seeds many years before they were common in the trade.

A list of species naturalized in California through the efforts of this one botanist would be much too long to print here. I believe, however, that such a list would include the leading Casuarinas, all our more valuable Atriplexes, many brilliant shrubs now comparatively common here, Araucaria Bidwilli, Aberia caffra, and fully fifteen species of Acacias and Eucalypts. I know of several fine Hakeas grown from seed sent by him many years ago. This summer Mr. G. P. Rixford, of San Francisco, after sixteen years of waiting, bloomed a noble Iris (*I. Robinsoniana*) from one of five seeds received from Baron Von Mueller. This plant is figured on page 255 of the current volume of GARDEN AND FOREST. Perhaps for years to come new species of plants will be arriving at maturity here, to strengthen our grateful memory of this old botanist.

In later years the Baron had a habit of placing certain favorite seeds in every consignment. All his packages, which once were rather conventional as regards appear-

ance, became more and more unconventional, until most of them utilized various kinds of empty tobacco bags. Not long ago I received a side light upon this subject from a much-traveled English woman, who said: "I was once for several days on a steamer with Von Mueller. He was going off to a camp in some wilderness and was dressed like a laborer. He sat on the deck all day, looking at the sky and ocean and smoking a little old black pipe, with tobacco bags in each of his pockets. He seemed very good-tempered, but he did not strike me as clever, though I heard he was a famous man."

A picture of the Baron in his Sunday best, decorated with medals of honor, hangs in the botanical department of the University of California, and a lovable face it is. But I like best to think of him in old clothes, smoking the little pipe, and going off into the wonderful Australian forests.

Niles, Calif.

Charles H. Shinn.

Foreign Correspondence.

Nepenthes.

MR. HARRY J. VEITCH read a valuable paper on *Nepenthes* at the last meeting of the Royal Horticultural Society. A selection of species and hybrids was exhibited from the famous Chelsea collection, which for many years has been admittedly the best in England, if not in the world. Messrs. Veitch & Sons were the first among the nurserymen to collect these plants, and most of the hybrids now in cultivation were raised in their nursery.

Commencing with the history of the genus, Mr. Veitch traced the discovery of the various species. The first known was *Nepenthes Madagascariensis*, a comparatively unattractive species, which singularly enough was one of the last to be introduced, Messrs. Veitch having obtained plants of it for the first time in 1878. About thirty species are known and these are found principally in Malaya. The pre-Linnæan name for the genus was *Mirabilis*, Linnæus, who knew only *N. distillatoria*, renaming it *Nepenthes*, "Freeing from Grief," and stating that "if this is not Helen's *Nepenthe* it certainly will be for all botanists."

Nepenthes Rafflesiana was introduced to Kew in 1845. This was followed by the closely allied *N. Hookeri*, introduced by Messrs. Low & Co. in 1847. Then Messrs. Veitch sent a collector in search of *Nepenthes*, and various species were thus obtained by them. The discovery of four wonderful species in Borneo by Sir Hugh Low led to the preparation of a classical paper on *Nepenthes* by Sir Joseph Hooker, which was published in the *Transactions of the Linnæan Society* in 1859. A few years later these and other insectivorous plants were the subject of Sir Joseph's Presidential Address to the Linnæan Society, and this, with Darwin's work on the same subject, gave these plants an interest for horticulturists and for the laity which they have ever since maintained.

The four largest species are *Nepenthes Rajah*, *N. Edwardsiana*, *N. Lowii* and *N. villosa*. These are all wild on the mountain of Kina Balu, in Borneo, where, according to Mr. Burbidge, the natural conditions as regards temperature and moisture are somewhat peculiar. This may account for the failure of cultivators with three of these species. The only one successfully cultivated so far is *N. Rajah*, and this is only grown at Glasnevin, where Mr. Moore has always kept it in a cool house along with *Masdevallias*. A pitcher taken from his plant, shown by Mr. Veitch, astonished everybody by its size, vigor and rich colors; it would probably hold a pint of water. Another species, *N. Edwardsiana*, has pitchers twenty-two inches long and capable of holding two quarts of water. The size of these pitchers can be understood when it is stated that a drowned rat was found in one of them by Sir Hugh Low.

By the year 1872 ten species of *Nepenthes* had been successfully established in gardens here and four hybrids had been raised. The first of these was *Dominiana*, raised in Messrs. Veitch's nursery in 1862. The introduction of *N.*

sanguinea, *N. Veitchii*, *N. Curtisii*, *N. Burkei* and *N. Northiana* has added considerably to the popularity of the genus, and as numerous hybrids have been raised from these the variety of pitchers has been greatly increased. The best of all hybrids is *N. Mastersiana*, raised by Messrs. Veitch & Sons from *sanguinea* and *Khasyana*. It is easily cultivated, is dwarf in habit, pitchers freely, and the pitchers are large and of a dull crimson color. Next to this come *N. mixta* and *N. Dicksoniana*, the latter a hybrid between *N. Rafflesiana* and *N. Veitchii*. *N. Morgania*, a hybrid of American origin, is also highly appreciated here.

There are, according to Mr. Veitch, over forty hybrids enumerated, but some of these are merely variations of the same hybrid, much variation being shown by plants out of the same batch of seedlings. It is probable also that some of these so-called hybrids have been obtained by crossing varieties with each other. The introduction of *N. Northiana* was due to the enterprise of Mr. Veitch, who on seeing in 1880 a painting of it which Miss North had made from a plant brought to her by a native when in north-eastern Borneo, obtained particulars from her and despatched a collector for it. He found it growing below the ledge of a cliff and succeeded in getting home seeds of it. Mr. Veitch says it has proved one of the most tractable of the *Nepenthes* under cultivation and one of the handsomest. A recent introduction from the Seychelles, namely, *N. Pervillei*, was exhibited from Kew, where it has been raised from seeds. It is remarkable for the length of the pitcher-stalks and for the elegance and rich coppery-red color of its pitchers. This species has always been a special desideratum with botanists as well as cultivators, and it has taken twenty-five years to get it successfully introduced. Plants of *Nepenthes* rarely recover from the effects of a long ocean voyage, while the seeds are so easily damaged that one may try time after time and fail.

The seeds ripen in about three months after fertilization, and germinate in about six weeks. The first leaves after the cotyledons invariably bear tiny pitchers. Some species are said to bear only tiny pitchers and no leaf-blade when young. With good treatment plants twelve months old have leaves four inches long and pitchers an inch long. The stronger-growing sorts grow from three to four feet in a season and produce from twelve to eighteen pitchers. The best pitchers are produced by basal shoots or short plants, and for this reason cultivators prevent the plants from making long shoots by pinching the tops out of them when about a foot long. If allowed to grow the stems will attain a length of twenty or even thirty feet. The pitchers developed on long stems are smaller, narrow at the base and less highly colored than those on short stems. There is not much variation in the leaf characters of the genus, some being longer and narrower in the blade than others. They are all strap-shaped, leathery in texture, green, and the pitchers are suspended on stalks formed by the prolongation of the midrib of the leaf. This stalk performs the duties of a tendril, twisting round a twig in precisely the same way. By this means the plants in a wild state succeed in climbing up into sunlight. It is noteworthy that the species which produce the largest pitchers grow at a high altitude where the conditions are subtropical or even temperate. According to Mr. Burbidge these species are always terrestrial, comparatively short in stem, and their pitchers usually rest on the ground. The same authority stated that in Borneo these plants are known as Monkeys' Cooking-pots and that the natives drink the liquid found inside the pitchers before they open, as a cure for indigestion. All the species are insular in habitat, and they are mostly local, the exception being *Nepenthes gracilis*, which is found all over Malasia.

The following selection of species and hybrids represents what are here considered the best for the garden: Species: *Burkei*, *Curtisii*, *distillatoria*, *hirsuta*, *Northiana*, *Rafflesiana*, *sanguinea* and *Veitchii*. Hybrids: *Amesiana*, *Dicksoniana*, *Mastersiana*, *mixta*, *Morgania*, *Sedeni* and the new *Tiveyi*. This last was shown for the first time



Fig. 49.—*Rhus trichocarpa*—See page 384.

1. A flowering panicle, natural size. 2. A fruiting branch, natural size. 3. A staminate flower, enlarged. 4. Stone of a fruit, enlarged.

this week by Messrs. Veitch. It is named in compliment to their grower of Nepenthes, Mr. Tivey. It is a hybrid between *N. Veitchii* and *N. Curtisii*, and resembles the latter, but the pitchers are paler in color and have the wide rim of those of *N. Veitchii*. It was awarded a first-class certificate.

London.

W. Watson.

New or Little-known Plants.

Rhus trichocarpa.

RHUS TRICHOCARPA* (see illustration on page 383 of this issue) is a slender tree frequently twenty-five feet in height and a native of Japan, where it is a common forest plant in Yezo and in the mountain regions of central Hondo, where it also often springs up in hedgerows. The leaves are eighteen or twenty inches long, unequally pinnate, with dark red-purple midribs and usually thirteen broadly ovate, long-pointed, short-stalked membranaceous leaflets, hirsute below, especially on the stout midribs and primary veins, from three to five and a half inches long and from an inch and a half to two inches wide. The flowers are produced in narrow erect panicles, appearing in early summer, and are soon followed by the pale prickly fruit borne in loose drooping clusters. The habit of this tree is not particularly good, and its flowers and fruits are not attractive, but in the autumn it lights up the Japanese forest with splendid tints of orange and scarlet which are not surpassed in brilliancy by those of many other plants. Introduced into the Arnold Arboretum five years ago, *Rhus trichocarpa* has proved perfectly hardy up to this time in eastern Massachusetts, and this year has flowered and produced its fruit for the first time.

C. S. S.

Cultural Department.

Raspberry, Bunyard's Superlative.

I WAS surprised to find two years ago how good a fruit this is as grown in English gardens, and was at once ambitious to try it in the conditions of our New England climate. A hundred young canes were obtained and these we have fruited in the past two seasons. We are satisfied that there are few, if any, Raspberries to equal this for size and flavor. This impression also finds favor with Messrs. Ellwanger & Barry, who have about 40,000 plants of this Raspberry in their grounds, soon to be distributed. The canes are very stout and rigid, so that no staking seems to be required; the berries are abundant, and so large that they are often coxcomb-shaped like some strawberries. The fruit bears transportation better than that of many of the smaller varieties. Messrs. Ellwanger & Barry assure me that this variety is as hardy as any they grow, and much harder than some others of native origin. This statement is reassuring, for we have covered our canes with earth each winter to make sure of them, as is necessary in this section with all the other varieties to obtain a crop. Many kinds are under trial here to find out which is the best. We have most interest in a lot that are the result of two large berries taken when ripe in the summer of 1896, rubbed out in fine dry sand and sowed at once. The seed pans were frozen early last winter and brought into warmth the beginning of the year, when the seeds at once came up. From this seed we have now more than two hundred fine young canes, averaging four feet in height and still growing. These plants, we think, are the result of a cross between the Cuthbert and Superlative Raspberries, as these two kinds grew together and bees were plentiful. Great variation is apparent in the habit of the seedling canes, and we shall watch with interest their fruiting next summer. There is yet much scope for improvement in Raspberries; none are hardy enough, the habit of many, especially the new Columbian, is very distressing when one has to pick the fruit, and afterward when the new growth is so far advanced as to become prostrate.

As already stated, Raspberry canes require protection in this section by laying them down and covering them with earth in the fall. One season the frost came early and continued, and the canes could not be laid down in the usual way. Loose

straw litter was strewed over them after they were laid on the level. This plan was only tried once, as the field mice congregated apparently from the whole county, and in spring not one cane was left ungirdled. There were no Raspberries that summer.

South Lancaster, Mass.

E. O. Orpet.

The Cultivation of Cannas.

IT is interesting to look back a decade and note the progress made in the cultivation of Cannas. The development of the Crozy type, from which almost every high-class variety has come, is most interesting. In no class of plants can less credit be claimed by the hybridist, for the best Cannas have resulted from careful selection. The arrangements for close fertilization are so complete that it is almost impossible, if fecundation is secured, to thwart Nature. It was predicted when the large-flowered giants of the Flaccida type, Italia and Austria, were introduced that they would supersede the Crozy type. Both these types are continuous bloomers, but what is lacking in the blooms of all Cannas, durability of texture, is still more lacking in the Italian varieties. The flowers are extremely fugacious, and what I have seen of the half a dozen or more new colors in this section they all have the same defect. The American variety of this type, the Burbank, is no better in this respect; in appearance it resembles the variety named Austria.

As pot-plants for foliage effects Cannas are highly effective, and under glass, with shade, the flowers are more durable. This is true of all Cannas; under glass the flowers have better individual development and last long enough to fill out a good round truss. Canna specialists hesitate to judge a variety by its behavior under glass; the supreme test is out in the open air. Paul Briant is superb under glass, but of little use under direct sunlight. For a bedding Canna a compact truss is a strong recommendation. Among medium growers, Queen Charlotte and its "improved" variety are the finest. The flowers are widely banded with yellow and durable. An effective combination in a circular bed may be made with plants of Queen Charlotte in the middle and Mrs. Fairman Rogers, a fine form of the Crozy type, as an edging. Mr. Denys Zirngiebel, of Needham, Massachusetts, who makes a specialty of Cannas, considers President Cleveland, a salmon-scarlet, the finest bedding Canna of its color yet introduced. It is very compact, and in vividness of coloring it outshone all others in a large patch containing sixty varieties. It was raised by Mr. Pfister, gardener at the White House. This list comprises scarcely half a dozen first-class varieties, if the dark-leaved sorts are excluded. Bismarck, a recent variety, showed up well; it has a dwarf habit and compact and full-flowered truss of crimson flowers. Robert Christie is a beautiful salmon-red and a splendid pot-plant; Ami Pichon is a good maroon with deeper spots; Leonard Vaughan is a fine dark-leaved kind with scarlet flowers; J. D. Cabos has orange-scarlet blooms; President Carnot has luxuriant foliage.

Wellesley, Mass.

T. D. Hatfield.

Notes on the Orchid-flowering Cannas.

WE have been greatly interested in the new Orchid-flowering Cannas since their first announcement, and have taken some pains to grow most of the varieties offered for sale. A note regarding the variety America was sent to GARDEN AND FOREST some weeks ago (see vol. x., page 178), and a completer account has been more recently published in the *Tenth Annual Report of the Vermont Experiment Station*, page 119. Since that report went to press we have brought two new varieties of these Cannas into blossom. These are Bavaria and Burgundia, both from the lists of Dammann & Co., the originators of Italia, Austria and America.

We are somewhat disappointed in these two newest varieties, not because of bad qualities, but on account of their close resemblance to Italia. Italia is a beautiful Canna, to be sure, perhaps the best one of this class yet introduced, but Burgundia and Bavaria are so much like it that a careless observer would pass them by as all of the same kind.

Both varieties are, however, of smaller stature than Italia and have smaller foliage. The flowers in all three are of a brilliant canary-yellow upon which two shades of rich apricot-red are successively overlaid. In Italia the red colors are run together in the throat to make somewhat regular solid blotches bordered with very deep bands of the clear yellow, like an exaggerated Queen Charlotte. In Bavaria there is very little of the darker red shade, while the lighter red is scattered in small dots well out upon the petal-like staminodia, giving an effect more like that of Florence Vaughan. Burgundia is almost a medium between Bavaria and Italia, with more of the dark

* Miquel, *Ann. Mus. Bot. Lugd. Bat.*, 11, 84 (1865) (*Procl. Fl. Jap.*, 16).—Franchet & Savatier, *Enum. Pl. Jap.*, 1, 93.—Engler, *De Candolle Monogr. Phaner.*, 1v., 379.—Sargent, *Forest Fl. Jap.*, 34.

overlying red than the former, and more of the leopard spotting than in the latter. Burbank, the only variety of American origin yet advertised, does not seem to have been noted so much in the horticultural press as its good qualities deserve. It is the equal of the Italian varieties. The flowers have the form of Italia and nearly the coloring of Austria. That is to say their form is the best, and their coloring pure canary-yellow with a few faint reddish spots in the throat.

These new Cannas, hybrids of Madame Crozy with *C. flaccida*, are especially admirable for two qualities, namely, the perfection of form and the richness of color in their blossoms. The type of Canna-flower which we are used to seeing among the French dwarfs, when taken by itself, is singularly inharmonious and unsatisfying in its outlines, but there is a fullness of form and grace of outline among the Orchid-flowering sorts which by comparison is altogether pleasing. Their richness of coloring is remarkable. The comparative size of the flowers has been considerably overstated in the advertisements. They are quite large enough, to be sure, but they are only a little larger in fact than Charles Henderson, Alphonse Bouvier, or dozens of other old and well-known varieties.

Several of these varieties we have had this year in quantities sufficient for liberal use in outdoor beds. Their large, luxuriant, Musa-like foliage is quite effective, but there is a noticeable paucity of flowers in comparison with the older French dwarf sorts. The softness and flaccidity of the blossoms detract somewhat, of course, from their usefulness out-of-doors, but not so seriously as we had expected. The flower-spikes, though comparatively few in number, are fairly durable and effective as far as they go.

The Orchid-flowering Cannas—and, by the way, they ought to have a better class name—are certainly attractive novelties for the amateur, but in their present state they are not likely to find great favor among professional gardeners, who are interested chiefly in gaudy red and yellow floral effects.

University of Vermont.

F. A. Waugh.

[The Italian hybrids noted grow strongly in this latitude, their principal defect being that their flowers scorch under our summer sun, and they are for this reason not as effective as the size of the flowers would indicate.—ED.]

Hot-house Palms.

AMONG the Palms which require a warm temperature, *Stevensonia grandifolia* is one of the handsomest. It is most attractive when the plants are from two to eight years old. There are apparently two distinct forms of this species, one has leaves uniformly green, and in the other form they are dotted with a reddish yellow color.

Pinanga Kuhlilii is a rapid grower and reaches the fruiting stage in about four or five years; so far as I know it is only exceeded in this respect by *Geonoma fenestrata*. *P. Kuhlilii* must have a moist, warm atmosphere. The leaves are quite large, with from eight to fifteen pairs of irregular pinnæ. The fruit is rather ornamental, at first yellow, changing to a dark purple when ripe. Old plants send out growths from the base of the stem. This is a desirable species for planting out in a conservatory.

Hyophorbe amaricaulis is pleasing when young, and the same may be said of *H. Verschaffeltii*. It is difficult, however, to keep them in good condition when they become a few feet high. The last-named species was very popular twenty years ago as a decorative plant, but has been displaced by the *Kentias* and by *Areca lutescens*.

Acanthophoenix crinita and the variety *Herbstii* are neat-growing, small-sized Palms. The leaves are pinnate, the pinnæ arching toward the ends. This species suffers quickly if the soil in which it is growing is allowed to become dry.

Ceroxylon niveum, one of the Wax Palms, can scarcely be said to be ornamental when young, for the leaves are coarse and undivided. As it grows, however, it becomes highly ornamental. The long, feathery leaves are grayish green. Although it will thrive in the temperature of an intermediate house, it puts on a more graceful appearance when given stove temperature.

Latania Commersonii has immense palmate leaves, and is only fit for botanical collections.

Livistona Jenkinsii is an Indian species of great beauty when a few feet high. In young plants the leaves are irregular in shape; in adult plants they lose this peculiarity. The leaves have a bright, almost emerald-green color not found in any other species of *Livistona*. *L. rotundifolia* resembles *L. Jenkinsii* somewhat, but is smaller in all its parts. In young plants

the leaves are closely arranged together with short stalks; the leaf-blades are completely round, with about sixty divisions. This Palm is rapidly becoming popular as a decorative plant and is being largely grown by some dealers.

Licuala grandis is cut up in the ends of the leaves for a short length, thus giving the plant a fuller, rounded appearance than that of other Fan Palm. It needs a hot, moist atmosphere or it is liable to become infested with red spider.

Calamus Lewisianus, *C. fissus* and *C. palembanicus* are ornamental Palms with graceful pinnate leaves. They are only suitable for conservatories with plenty of head room, as they grow tall.

Arenga saccharifera has immense pinnate leaves of a dull green color. It is only useful in large houses.

Euterpe edulis is probably the handsomest of all the feather-leaved Palms, and should be in every collection. It has the same habit of growth as *Seaforthia elegans*, but the leaves are smaller and more compact. Plants fifty feet high have stems only a few inches in diameter.

Botanic Garden, Washington, D. C.

G. W. Oliver.

Notes on Propagation.

MANY tender foliage plants make their most rapid growth during the latter part of the summer. The root-action of the parent plant is then free; it is therefore easy to root cuttings. For example, *Crotons* can be rooted easily at this season by using the topping method, frequently practiced for *Ficus*. This method is the most satisfactory one for strong and highly colored growths, from the fact that little or no foliage need be lost, as may be the case when a strong and sappy growth is at once removed from the parent plant for cutting purposes. Large *Dracænas* may also be similarly topped with the loss of but few leaves, and the young plants thus secured have the advantage of large leaves at the bottom and make more symmetrical specimens for the next season. Old plants of *Yucca quadricolor* that have become unsightly from the loss of their lower leaves may also be renewed by topping. For these plants it is advisable to nick the stem quite deeply, and the bandage of moss used need not be kept quite as wet as is necessary for *Crotons* or *Dracænas*. After the removal of the top from an old *Yucca* the stump may be kept rather dry for a time to avoid decay, when other breaks will appear and furnish new stock, in addition to the suckers that are likely to show from the roots.

Cuttings of such easily managed plants as *Sonerilas*, *Bertolonias* and *Fittonias* may be rooted at almost any season, and it is not too late now to increase the number of these plants. The most effective way of using low-growing plants of this character is to group a number together in an eight or ten inch pan filled with a rather light and well-drained compost.

Small side-shoots of *Cyanophyllum magnificum* and *Sphærogyne latifolia* make satisfactory cuttings, which should be kept rather close and warm in a propagating-frame to insure their rooting. The best medium for rooting them is a mixture of cocoa-fibre and sand. Single-eye cuttings of these plants also root readily, but do not always make as shapely specimens as the side-shoot cuttings, and sometimes refuse to start away promptly. A well-colored specimen of the Variegated Pine-apple is among the most effective of stove-plants. The crown of a fruiting plant provides the best cutting material, and will root freely in pure sand if placed in a light position in a warm house and given but little water. Young plants may also be secured from sections of the stem of a rather leggy specimen. These sections should have the cut surfaces dipped in slaked lime to prevent decay, and then be half-buried in sand and treated like top cuttings.

Pandanus Veitchii has no special season for propagation, but cuttings planted in cocoa-fibre will root quickly during the latter part of the summer and early fall. The cuttings should be kept somewhat dry.

The propagation of *Nepenthes* is comparatively easy in a warm propagating frame; the only exception to this rule is found among those species having hirsute leaves, of which *N. lanata* and *N. villosa* are types. Small, short-jointed side shoots of *Nepenthes* are the best cuttings and usually produce the finest pitchers. An open mixture of rough peat and sphagnum moss is the best material in which to root them. The cuttings must never become dry, for once wilted they seldom recover.

Success in the propagation of tender species depends also upon the after treatment of the newly-rooted plants. In most instances the safest plan is to return the young plants to the cutting frame for a week or two after they have been potted off and gradually give them more air as the roots become

established in the new soil. They should finally be removed to permanent quarters as they begin to grow. These details of management are, however, the most difficult lessons to learn in the work of propagating.

Holmesburg, Pa.

W. H. Taplin.

Sternbergias.

STERNBERGIA MACRANTHA, which was reported last year as flowering much later in the season, opened its first flower in the middle of September, and its blossoming time is evidently about that of *S. lutea*, which is now in full bloom. *S. macrantha*, as its name indicates, has a large flower about twice the size of that of *S. lutea*, but one misses the foliage which only appears in late winter, and unless *S. macrantha* is grown under a mat of some low-growing plant it misses much of its effectiveness. This species was collected a few years ago by Mr. Whittall, who introduced it to cultivation.

Sternbergia lutea, which has a strong tradition of being the Lily of the Field, is certainly one of the most cheerful and attractive of the low-growing small flowers. The common name of Winter Daffodil is not as inapt as popular names often are, for it somewhat repeats the spring effect of yellow Daffodils, with golden-yellow flowers and plentiful foliage to enhance its charms. The flowers show their full charms only to the sun.

Elizabeth, N. J.

J. N. Gerard.

Calochorti in a Southern California Garden.

DURING the past season I have had much pleasure in cultivating Calochorti in the garden. In a good collection the season of bloom here continues from the first of March to the middle of July. The first species to open is *C. Catalinae*, with large white flowers, shaded lightly with purple on the outside and with deep wine-colored spots at the base of the petals. It continues in bloom for two months. A rare and lovely form is *C. Catalinae alba*, with pure white flowers and no trace of purple, but small yellow spots at the base of the petals. *C. Catalinae* is in flower for two months. Before it is done *C. clavatus* appears, and this, in my opinion, is the finest of all the yellow-flowering kinds. A year ago I wrote to GARDEN AND FOREST (see vol ix., p. 249) in praise of *C. luteus concolor*. I have since found that I was in error and that the plant described was *C. clavatus*. These flowers are often four inches in diameter, of the richest golden-yellow, with rich brown markings in the centre. Occasional plants bear pure yellow flowers. The plant is robust and easy to grow in any soil. About the same time flowers of *C. venustus* and its varieties appear. *C. venustus roseus* has charming pink flowers. Some of the *venustus* El Dorado varieties are fine, and one having rich wine-red flowers was conspicuous.

Even here the desert species are difficult to grow outside of their habitats. My best success with *Calochortus Kennedyi* was in boxes of decayed granite soil brought from the mountains. The flowers of this species are unique in color, being of the richest orange-scarlet, with purple spots in the centre. *C. Weedii* and *C. venustus citrinus* bear interesting flowers, but they cannot compare in beauty with those of *C. clavatus*. The last species to bloom is *C. Plummerae*; the flowers are large, in color rich lavender-purple and lined with yellow hairs. It continues in flower quite into July. *C. luteus*, *C. albus* and *C. amoenus* are interesting, but to my mind not so fine as the true Mariposa Lilies.

Los Angeles, Calif.

E. D. Sturtevant.

Correspondence.

Notes from Missouri.

To the Editor of GARDEN AND FOREST:

Sir,—After favorable weather in spring and early summer throughout this section came the unwelcome change of a drought, and week after week the earth was scorched. The dust was bottomless and the meadows have been brown as in winter. Here and there on rocky hillsides great patches of trees are apparently dying, and every leaf hangs crisp and sere from the shriveled twigs. Early in September I noticed Peach and Pear-trees growing in thin, hard soil, with the fruit actually shriveling upon the trees. Should this drought be followed by a severe winter thousands of fruit-trees in this state will die, for experience has repeatedly demonstrated that imperfectly developed and prematurely ripened wood has low vitality; seasons such as this are vivid object-lessons, showing the need of extra care in planting.

Vegetation has by no means suffered alike. Flowers, vegetables and young trees planted in ground that was well pre-

pared found encouragement for early and deep growth; while these have languished, they have borne the drought well and have attained fair development. Trees that have been pruned and mulched, and in the case of fruit-trees, had the fruit thinned so as not to tax the tree's vitality, withstood the trying heat well. In the third week in September we picked pears, peaches, grapes and apples of fair size and smooth and free from blemish. A popular belief exists that it does not pay to grow fruit extensively in a climate subject to drought. It is more reasonable to protest against neglecting fruit-trees in a country liable to dry summer seasons. Nature has given this south-western country a soil and climate peculiarly adapted to the production of large and highly-flavored fruit. Even in this drought I have seen peaches half of which would not go through the mouth of an ordinary Mason fruit-jar, and in favorable seasons pears weighing twenty-two ounces and plums measuring six inches in circumference have been grown here. But such fruit does not grow promiscuously. Overcropped trees, or those left to the mercies of the apple-borer and codling moth, give but common fruit in the most favorable seasons; in trying seasons such as this they are all but failures. Our most productive Pear and Plum-trees are mulched, and I believe this care pays in dollars and cents.

The flowers at Oak Lawn withstood the dry heat remarkably well. A threatened failure of water-supply cut off the use of the hose except for a few potted and special plants. The closely shorn sward of the lawn has been distressingly brown, and the contents of several flower-beds have succumbed. Nevertheless, there are many plants yet in full bloom, even where the sun has shone fiercest and hottest. I can account for it in no other way except that the beds are deep and mellow and the plants have grown large enough to shade the ground and prevent surface evaporation, while their roots have struck deep enough into the earth to find moisture. Roses, Cannas, Cockscombs, Phlox, Snapdragons, Dahlias, Petunias, Portulacas and Marigolds have done best among flowering plants, though a score more have given a few scattering blossoms. Vines of all kinds have been unusually luxuriant, and Passifloras, Manettias, Ipomoeas, etc., have flowered luxuriantly. My experience is more and more in favor of vines, shrubs, perennials and tuberous plants for ornamental purposes in countries subject to dry weather. Annuals and bedding plants should be planted in situations which are in shade a part of the day or in the shelter of some building. Double the display of flowers may be had for the same expenditure of labor and money if good judgment is used in selecting and planting.

Pineville, Mo.

Lora S. La Mance.

A Missouri Fruit-farm.

To the Editor of GARDEN AND FOREST:

Sir,—The Olden Fruit Farm, to which reference was made last week in my notes from the Ozark region, now comprises three thousand acres. This tract was mostly virgin soil, and covered with the native tree growth which is largely made up of Black Jack Oak, when the farm was established between thirteen and fourteen years ago. But it also includes several outlying farms of much older origin, all of them having Peach and Apple orchards, some now thirty years old. The condition of these orchards aided Colonel J. C. Evans, the experienced fruit grower, who founded the "greater Olden Fruit Farm," and who still controls it, in deciding on a suitable location for his enlarged enterprise. This large farm takes its name from a pioneer fruit grower named Olden, who owned the old place that became the nucleus of the present great undertaking.

Altogether there are 105,000 Peach-trees on the place. Among the large proportion of Elberta trees there is one block of 12,800 trees of that popular variety. Of these about 75,000 are in bearing.

The average expense of starting a new Peach or Apple orchard is given by Superintendent Mosely, of the Olden Fruit Farm, as follows: Cutting off the trees, known locally as slashing, \$3.00 an acre; clearing and burning, \$1.00; grub breaking, \$3.50; picking and burning stumps and roots, \$2.50; stock, \$7.00, or about four cents apiece for either Peach or Apple-trees.

Peaches are invariably set on the highest ground in the Ozark region, as the position largely exempts them from the danger of late spring frosts. Apple orchards occupy the dipping intervals. In many orchards Peach and Apple-trees are set alternately, with the idea that the Peach-trees will have reached the limit of profitable bearing by the time they crowd the Apple-trees. But this plan is neither followed nor approved on the Olden farm, where that limit is not yet estab-

lished, for the thirty-year-old trees on the old, original farms still give profitable crops as regularly as the younger trees. Corn is grown between the fruit-trees. This crop, which averages twenty-five bushels to the acre, is fed to hogs, and this proves the most profitable way to occupy the ground while the orchards are maturing. It is stated that at least one carload of hogs is shipped from the Olden farm every week in the year.

This farm is well equipped for utilizing its enormous fruit crop. Large shipments of fresh fruits are made by rail daily, and there is a small but complete canning plant with a capacity of 5,000 cans a day, the output of which it is expected will this year reach 50,000 cans, or eight carloads. There is also a modern distillery with a capacity of twenty barrels a day, where all surplus or inferior peaches and apples are made into brandy of the highest grade, and where the entire crop from forty acres of Blackberries is also consumed.

The red, gravelly soil of the Ozark fruit region looks unpromising in itself, and it is in many places closely covered with a really forbidding and formidable covering of rocks or stones, ranging in size from that of an egg to a loaf of bread. These do not seem to interfere greatly with plowing, as the stones are seemingly all on the surface and slide to one side. They are considered an actual advantage to the orchards in that they act as a mulch, and keep the ground cool and retain moisture near the surface. Both orchards and crops on the soil so mulched endure drought better than on ground that is free from stones.

Brighton, Ill.

Fanny Copley Seavey.

A Wet Season.

To the Editor of GARDEN AND FOREST:

Sir,—A wet season affords a special opportunity to note the differences and the compensations of various soils and situations. In every place of any extent, especially where the surface is varied, there is some variety in this respect. Skill in adaptation will show a surprising effect in the results. It is the taking advantage of these slight helps that may mean success or failure. Walking about the grounds of a friend this summer I came upon a broad sheet of Forget-me-nots, which filled a hollow near the outlet of an attractive little pond, used for supplying ice. My friend explained that she had tried to establish a large bed of *Myosotis* in her garden three times and failed; then this spot was selected and proved a place where the plants were perfectly at home, and they grew and flowered and spread with the utmost luxuriance.

Flowering and fruiting plants that require a large supply of water and those which resent an excess of water are clearly differentiated in a season like the one just closing. From notes taken in a garden of fruits and flowers, which includes four or five acres of varied surface, both the gains and the losses of such a season appear.

Perennials generally have done only moderately well. Hardy Chrysanthemums, perennial Phloxes and some others have mildewed badly. Annuals, on the contrary, have given profuse and persistent bloom. Shrubs have made unusual growth. Out of a tolerably full collection of the most reliable hardy shrubs, set within five years, only a small proportion made satisfactory growth during the three preceding dry summers. But with liberal mulching the roots have done better than the wood, apparently, and this year the copious rains have induced a rapid production of vigorous shoots.

Vegetables, especially root crops, succeeded well in a soil naturally light and dry.

Early peaches rotted so badly this year that an almost total loss of the large crop is the result. Late varieties did well.

Details vary, and everywhere the gardener who looks for lasting results needs to study the capabilities of the actual situation, but the suggestions of a wet season may be turned to account in a dry one, if there is at command that most important auxiliary, an adequate and easily controlled water-supply.

Amherst, Mass.

D. H. R. Goodale.

Insects in the Garden.

To the Editor of GARDEN AND FOREST:

Sir,—In passing a fine specimen of the rare and beautiful Yellow-wood I was surprised to note that it was badly attacked near the ground by what appeared to be some relation of the Locust-borer. I have frequently thought that we shall have to make the destruction of insects as regular a part of systematic gardening as the destruction of weeds. At present there is little account taken of insects by most owners of gardens. Rotten peaches are seen, but it never occurs to the grower to

look inside for the larva of the curculio ready to emerge. The damage is supposed to be the result of something mysterious, and perhaps some editor is written to for a solution of the puzzle. We may go into one of many gardens and see the leaf-worm at work before the owner's eyes, who is in utter ignorance that an insect is on hand. It is not uncommon to see beautiful and rare evergreens utterly destroyed by this curious and active creature. In some seasons certain insects are more damaging than others. This year the red spider has been singularly destructive of evergreens, and the honey aphids of Norway Maple and other trees. We have learned to know a weed when we see it, not, perhaps, that we know much about it, but because it is something out of place, and sooner or later a knowledge of injurious insects will also have to be a regular part of the education of every good gardener. Trees and plants should be examined systematically, and the work of annihilating these pests will not be found difficult when the task is begun in time and pursued intelligently.

Germantown, Pa.

Thomas Meehan.

Recent Publications.

The Water Garden, embracing the construction of ponds, adapting natural streams, planting, hybridizing, seed-saving, propagation, building an aquatic-house, wintering, correct designing and planting of banks and margins, together with cultural directions for all ornamental aquatics. By William Tricker. New York: A. T. De La Mare Printing and Publishing Company, Limited.

Nymphæas may or may not "have existed for all ages," as stated in this attractive book, but there is no question that for the last decade or so they have been much appreciated in gardens, public and private. It is also a fact that no form of horticulture meets with such universal appreciation as the water garden. The largest displays of the showiest or rarest flowers have cold appreciation from a large portion of the public, but there is a charm about a water garden with Nymphæas floating on the placid waters which reflect each passing cloud, and attract so many busy visitors of the bird and insect worlds, that fascinates the most careless observer. Nymphæas being of the easiest possible culture, there is no reason why they should not be grown in the smallest gardens as well as on large estates.

Mr. Tricker has been actively engaged in the growing of aquatic plants during the time when they have most rapidly gained in popularity, and perhaps no one has had a larger experience with Nymphæas of all kinds under cultivation. As will be noticed by the title, this manual is concerned with the practical side of water gardening, the details of which are treated fully. The making of tanks and artificial ponds and the adapting of natural waters to Nymphæa culture are all explained, as is also the handling and propagation of the plants. As to the planting, full details are given with extended lists of varieties, with the lack of perspective usual to such lists. The plant world is full of material in every section. What the intending grower wishes especially to know in starting any new culture is, which are the few best things most probably satisfactory for a beginning. A short list of this kind sharply drawn would be helpful to the increase of water gardens among the readers of the book. Aquatic plants under conditions of ample moisture and warmth grow so rapidly as to require care in selection and planting. As Mr. Tricker says, "overcrowding should be avoided, and everything cannot be represented on the borders of one pond," though we regret to say that some of his well-executed pictures of examples do not bear out his advice, overcrowded and spottily planted borders being sometimes conspicuous, instead of the broad, quiet effects more appropriate in such places. The pictures in the main, however, are suggestive of handsome effects, are well executed, and, like the book, are well printed; and *The Water Garden* is a most useful, suggestive and valuable manual for any one interested in horticulture.

Notes.

Charles J. Dawson, a son of Mr. Jackson Dawson, for many years head-gardener in the Bussey Institution of Harvard

College, has joined the staff of the Boston Park Department as chief of the Planting Division.

The first carload of California raisins for the season of 1897 was shipped from Fresno in that state on September 3d.

The hops in this state and on the Pacific coast are now all picked. Estimates of the yield in New York place the crop at from fifteen to twenty-five per cent. smaller than that of last year, and it is said the output in the western states will hardly exceed 110,000 bales. These figures indicate a shortage and higher prices than have recently prevailed.

In the Middlesex Fells and Blue Hills reservations near Boston, foxes have of late become so abundant that the question how to lessen their numbers has become a pressing one. They already do much damage in destroying the grouse, quail and other ground birds which inhabit the reservations, while no natural enemies exist to prey upon them in their turn.

Madame Gastellier, the earliest white Chrysanthemum, this season proved to be the first among all colors in this section, and flowers of this variety were sold here on September 18th. During last week there were also in trade flowers of the French variety, Marquis de Montmort, a pleasing pink resembling Viviani Morel, and of the English variety, Lady Fitz Wigram, a white sort.

Mr. E. D. Sturtevant writes us from Los Angeles, California, with reference to *Dendromecon rigidum*, that this plant, in California, is considered one of the finest native shrubs. The flowers are of the brightest pure yellow color, about two inches across and produced for a long period. The foliage is a peculiar grayish green, but the flowers are so beautiful that this may well be overlooked. Unfortunately, it is difficult to transplant, but if successfully moved it grows well in gardens there.

Not only has the Missouri peach crop been remarkably large this year, but all fruits have been abundantly produced in that state, and are of excellent quality. In the six leading counties in the Missouri fruit belt the acreage of bearing Peach-trees is now five thousand acres. Apples, by reason of high color, superior flavor and good shipping qualities, will command extra prices, and every variety of apple has done well. Missouri pears are selling as high as \$4.00 a bushel. Colonel J. R. Rippey, secretary of the State Board of Agriculture, estimates this season's fruit crop to be worth \$25,000,000. More orchards have been planted in Missouri during the past two years than in any other state, and thousands of acres are being set in Grapes.

Lima beans, from New Jersey, now sell at thirty cents a half-peck, and peas and string-beans cost forty cents for the same quantity. The best sugar corn commands fifty cents a dozen. Choice heads of cauliflower, from Long Island, cost twenty-five cents each, eggplants from ten to fifteen cents, and sweet potatoes thirty cents a half-peck. The cooler weather of the past ten days has stimulated the demand for celery, which is coming from near Rochester, in this state, and from Long Island and New Jersey. Cucumbers of uniform and desirable size, from Shelter Island, sell for five cents each; tiny cucumbers from near-by fields, for pickling, bring thirty cents a hundred, and green tomatoes, used for the same purpose, forty cents a half-peck. Small okra costs forty cents a hundred. Tomatoes, Brussels sprouts, kohlrabi, squashes and pumpkins are fairly plentiful, and radishes, carrots, turnips, parsnips, beets, horse-radish, salsify and celeriac are among the root crops now in season.

Crisp Red Callahan apples, from New Jersey, and the soft and more showy Alexanders, from Vermont, are choice table fruits at this time. Siberian crab-apples sell at thirty-five cents, retail, in ten-pound baskets, in New York markets, and large smooth quinces, from near-by gardens, cost \$2.00 a hundred. Although berries are no longer offered, a bewildering variety of fruits is still shown. On one stand in Washington Market are watermelons and muskmelons in plentiful supply at summer prices; large Japanese persimmons, from Florida; immense white Rareripe peaches, from New Jersey; nectarines, from California; fresh figs, from Virginia, in quart boxes, at twenty-five cents; Almeria grapes, from Spain, a portion of the first importation of this season; choice Black Morocco grapes, from California, nearly as large as plums, seven pounds costing sixty cents, besides Flame Tokays and other varieties from California, and Concord, Delaware and Niagara grapes, from Lake Keuka; Seckel, Bartlett and Comice pears; Green Gages, Reine Claude and Damson plums, from this state; Hungarian and Italian prunes, from Idaho, and Silver and Kelsey plums, from California; new grape-fruit from the Bahamas, and oranges from California and Italy. To this partial list of seasonable fruits must be

added chestnuts, the first shipments of which reached this city on September 23d from Ridgely, Maryland, and from cultivated groves in New Jersey. These large and handsome nuts sell for thirty cents a pound. Of course, lemons, bananas and pineapples are offered here, and cocoanuts. Of this latter fruit no fewer than 421,000 were received at this port last week.

A recreation pier, the second now established in this city, was opened to the public on last Saturday, and contracts for building three more are about to be let by the Board of Dock Commissioners. The first pier, at the foot of Third Street, on the East River, has been in use since early in July, and during the summer has been visited each day by from 1,500 to 6,000 persons. The new pier at Twenty-fourth Street extends 720 feet into the East River, and on its two floors can accommodate 14,000 persons. Music is provided every evening of the week, and it is worth going a long way to see the enjoyment of the residents of these crowded sections of the city in their use of these spacious gathering places. Seats are provided along each side. Promenading and singing the choruses to the airs played by a brass band are the main pastimes, while vociferous calls for encores of specially popular songs seem to give no small satisfaction to otherwise orderly boys. To others the water view and the shores outlined with electric street lights and the colored lights on ferryboats and steamships are the greater delight. Dancing proved objectionable after a short trial, in bringing together a disorderly class of people, and is not now permitted. In addition to officers of the Dock Department, matrons, in neat uniform, are in attendance. It is the intention of the Dock Commissioners, if they can get the necessary authority, to inclose the pier in glass and have it properly heated, so that it can be used all the year through instead of during the warm months only. The Park Board now has under consideration a proposition to stock the pier with flowers and plants, and the Board of Education will be asked to provide a course of free lectures for the winter months.

Farmers' Bulletin No. 58, just published by the United States Department of Agriculture, contains information about the Soy Bean, *Glycine hispida*, which is of practical interest to agriculturists. This Bean, of which there are some sixty varieties, is a native of south-eastern Asia, and has been cultivated in Japan and China for many centuries. Professor Georgeson, of the Kansas Agricultural College, made some experiments with the Soy Bean as long ago as 1891 (see GARDEN AND FOREST, vol. v., page 60), and in more recent tests carried on at several of the Experiment Stations its great value as a crop in this country has been clearly proved. In Europe, where successful experiments were made in 1875 and succeeding years, it has as yet failed to become a staple crop. The plant is an erect annual, with branching, hairy stems, trifoliate, more or less hairy leaves, rather inconspicuous pale lilac or violet colored flowers, and broad, two to five seeded pods, covered with stiff reddish hairs. The seeds vary in color from whitish and yellowish to green, brown and black, and in shape from spherical to elliptical and more or less compressed. Under favorable conditions the plant may reach a height of four feet or more. In the extensive series of experiments carried on by Professor Haberlandt in Austro-Hungary, the plants each bore about 200 pods and 450 seeds, and though this is probably considerably above the average it shows this Bean to be remarkably prolific. The flowers are self-pollinated, so that the yield is entirely independent of insects, and this fact renders the Soy Bean free from an important obstacle in the way of the introduction of many legumes into new regions. A crop of seed is insured wherever conditions are such as to allow the plants to make proper vegetative growth and reach maturity. This useful bulletin includes a description of some of the best varieties, the conditions of growth, methods of culture, and chapters on the time for harvesting, amount of forage yielded, the chemical composition of the various parts used for feeding purposes, its digestibility, its value and uses as a soiling crop, a silage crop, a hay crop and as a pasture plant and soil renewer. In the latter connection it is stated that the Soy Bean is highly valued in Japan as a nitrogen gatherer, and is extensively grown there in rotation with cereal crops. When first introduced into the United States this plant did not form root tubercles, owing to the absence of the tubercle organism in the soil, and it has been grown for several years in some localities without the appearance of any tubercles. In other cases they have developed in great abundance after a short time, and an illustration of the roots of a plant grown at the Massachusetts Experiment Station show them produced in great numbers. The purpose of the bulletin is to show the value of the Soy Bean as a forage crop, and an appendix is added by Dr. C. F. Langworthy, explaining its value as food for man.

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Penshurst Place.

PENSHURST PLACE will probably be remembered by American tourists as one of the most homelike of the great show-places of England. The house is placed on level ground in a gently rolling park, where knotty old Oaks stand singly, in immemorial security, on the grassy uplands, and in the hollows where the bracken grows breast-high. Some of these trees are known by the names of distinguished members of the family, or honored guests who have been received there, such as Sir Philip Sidney and Queen Elizabeth. Those who object to the romping character of modern dances may not have noticed a picture in the long gallery in which that illustrious dame is represented as dancing the coranto, a lively Spanish measure much in fashion at the time, in which the lady is lifted at least a foot from the floor by her partner.

The park front of the house is simple (see illustration on page 393), and the park is separated from the home grounds by a low ha-ha, from which the lawn comes up to the gray stone walls, not broken by flaunting beds of gaudily colored foliage plants, but plain and severe, as is suitable for the stern old building.

The pile is long in comparison with its height, as is often the case in old English houses, and bears on its face the marks of having been lived in and added to by many men at various times. The crenelated walls and narrow lancet windows are memorials of the earlier days when the home was only a home when it was possible to defend it, while the larger windows, flanked by Ionic columns, remind one of the work of Inigo Jones and Christopher Wren.

But it is to the garden front of the house, as usual, to which one turns to see the real charm of the place. A wide grass terrace runs very nearly the whole length of the house, and serves as a foreground for one of the most successful attempts at a reproduction of the old English formal garden. About thirty years ago, Lord Delisle and his architect, the late George Devey, designed the garden as it now is, after the manner of those described by Gervase Markham, and that other worthy who disguised his plain English name of Thomas Hill as Didymus Mountaine. From the

broad terrace close under the house one looks down on the flower garden, which is on a lower level and crossed by broad, straight gravel walks which meet at a circular fountain in the middle. A low stone curbing inside the wide grass margin of the paths marks a level still lower, where old-fashioned flowers nod gayly over their little Yew enclosures, which are not too high to hide anything but the earth of the beds. By this arrangement of different levels the flowers are seen from many points of view, so that the stroller has a chance to decide whether he prefers to look down at a mass of brilliant colors on a green lawn or to see and smell the flowers by going among them.

On one side of this sunken garden and at right angles to the house runs a long terrace, called in the language of the writers of old Herbals, a "mount." These mounts were very characteristic of old English gardens and were originally meant to bring a little amusement into the long dull days of the women living in the house. The boundary wall of the garden often overlooked a road, and was sometimes more than ten feet high on the outside. Against this the mount was built, an inside grassy terrace, reached usually by stone steps from the flower garden or a lower terrace. Persons walking on the upper level, which was only a few feet from the top of the wall, could easily see all that went on outside, while remaining safe from intruders. At the end of the mount farthest from the house, and in the angle of the enclosing wall, a garden house was built, which gave shelter from showers and sun, and had the further advantage of yet another outlook.

At Penshurst the mount can be reached either from the house terrace or the garden, but the original purpose of the early designers of mounts has been lost sight of, as it overlooks nothing but the home grounds. It must therefore be considered rather as a quaint addition to the plan, and as a pretty finish to one side of the garden, than as being archæologically correct. The walls of the mount and the house terrace are not the least of the attractions of the sunken garden, covered as they are with Ivy, spaliere fruits and tender shrubs that enjoy the extra protection given by the warmth of the brick.

From the garden straight walks lead to the fish-pond, a piece of water some thirty paces long and twenty wide, surrounded on all four sides by a wide grass verge and a high pleached Yew hedge. This little enclosure carries one back to the middle ages, when such fish-ponds were a necessary part of every priory or large manor house, since their inhabitants contributed largely to the larder on the many fast days ordered by the Church. One would hardly feel surprised, in a place like this, if some day one were to come upon a jolly Friar Tuck, gazing down into the clear waters of the pool and smacking his lips in anticipation of the delicious meal he would have from an especially fat and tender carp. Beyond the quiet pond, long walks, bordered by old Apple and Pear trees and bright with many flowers, open little vistas of the park and woodland beyond. In spring these walks are, perhaps, at their best, when the sun throws chequered patterns through the blossoming trees on the gravel, and the borders are gay with flowering bulbs; but autumn has its own charm in the fruit-laden trees and golden and purple glow of the season's last flowers.

As is so often the case in England, a little village of a few dozen houses huddles under the shadow of the great house, and a gate from the home grounds leads into a quiet street bordered with old cottages and their gardens. No railway disturbs the stillness of this hamlet, which can only be reached by driving from the station some two miles away, or taking a coach which runs from Tunbridge Wells. After this has taken its jingling departure, and when the last belated tourist has gone lingeringly away, the shrill voices of children and the cawing of rooks are the loudest sounds heard in the village.

No more charming excursion than this can be made in a day from London. Penshurst is in Kent, "the garden of England," and surely nowhere does it better deserve the name than at a place where there is a continuous succes-

sion of flowers from the first snowdrops until the last Christmas Rose is past. After a day spent here one goes back to the grimy city, with the lungs full of fresh country air, and the mind of memories of the great house standing in quiet dignity in the old park with its glades where the dun deer lie among the bracken.

EMBOLDENED by the action of Congress in practically revoking Mr. Cleveland's Forest Reservation proclamations and by the attitude of the administration toward the whole subject of our western forests, the lumbermen now controlling a large block of Big Tree forest on the western slope of the Sierra Nevada in California are making a determined effort to obtain from Congress authority to cut the Sequoia timber in the General Grant National Park. This particular portion of the Sierra Reservation includes about fifteen hundred acres, and is covered with an exceptionally fine growth of Sequoias and Sugar Pines, numbering among its vegetable wonders the great tree known as "the General Grant." This scheme of Californian lumbermen to get possession of this body of timber has been incidentally commented on in several of the papers of the Pacific states, but it is likely to remain generally unnoticed or to be forgotten until the country discovers some day that by a skillfully worded amendment to some appropriation bill it has been again robbed of a great possession for the benefit of a few speculators.

It is unnecessary to remind our readers that these Sierra Sequoias are marvels of the vegetable kingdom, unsurpassed in grandeur, and probably the oldest living organisms on the face of the globe. Every individual is a monument which should be sacredly preserved for the benefit of future generations. To cut down one of these trees is a crime, and it should be a matter of national humiliation that a considerable part of the Sequoia forest has been allowed to pass from Government control into the hands of lumbermen. There was no excuse for this; there would be less excuse in allowing those portions of the Sierra forest which have already been reserved for the benefit of the people to be opened to entry. The lumber, even, is not needed by the community, which can be abundantly supplied from the Redwood forests, and no one but a little group of men who expect to make money by this transaction has any interest in the success of this movement.

Notes on Cultivated Conifers.—I.

THE climate of the north-eastern portion of the United States is not favorable to the best development of coniferous plants, and only a comparatively small number of them can be satisfactorily grown in this part of the country. It is not always that our winter cold is too severe, for many of these trees flourish in mountain regions where the temperature sinks many degrees below the extremes of even the New England winter, but they cannot bear our dry summers and the drying winds of early spring, which draw moisture from the leaves faster than it can be supplied by the roots often fast frozen in the ground when evaporation is most active. Some beautiful and interesting conifers, however, flourish here, and in the following notes we shall publish the results of our observations on cultivated conifers in the northern and eastern states; and as the members of the Yew family are still popularly regarded as conifers they will be included with them.

In the Yew family (Taxaceæ) eleven genera, and in the Coniferæ twenty-seven genera, are now recognized. Of these, however, we need not consider *Pherosphæra*, *Phyllocladus*, *Dacrydium*, *Podocarpus*, *Stachycarpus*, *Saxegothæa* and *Microcachrys*, all Taxids of the southern hemisphere except *Podocarpus*, which comes north of the equator into tropical and subtropical regions of the two hemispheres, as none of them can be grown here except as pot-plants under glass. Of the true conifers we can pass by Tetra-

clinis, a monotypic north African genus, *Callitris* of Australia and New Caledonia, *Actinostrobus* with its west Australian species, the African *Widdringtonia*, *Fitzroya* of Chili, Patagonia and Tasmania, *Athrotaxis* of Tasmania, *Cunninghamia* with its single south China species, *Agathis* of New Zealand, Australia, the Pacific islands, Brazil and Chili, *Araucaria*, a pretty widely distributed genus of the southern hemisphere, and in Abietinæ *Keteleeria*, another monotypic south China genus. Representatives of many of these genera flourish in the gardens of southern California, and several of them will probably thrive in the south Atlantic and Gulf states, but their cultivation at the north except under glass is hopeless.

The genera of Taxaceæ which are available for our northern gardens are *Ginkgo*, *Cephalotaxus*, *Tumion* and *Taxus*. *Ginkgo* contains now a single species, although during the Tertiary period it was very generally distributed through the colder and temperate parts of the northern hemisphere with numerous species or varieties of which more than sixty have been described by paleobotanists. It is distinguished by the character of its lateral branchlets, which are sometimes elongated and more often short and spur-like, by its fan-shaped, two-lobed, many-ribbed, deciduous, pale green, clustered leaves, dioecious flowers, the males in umbels at the ends of the branches, the females in pairs on the sides of slender stalks. The female flower, which consists of a single naked ovule, becomes in ripening a sort of plum-like fruit, the outer layer of the seed-coat growing succulent, and the inner hard and woody. *Ginkgo* was first made known by the German botanist, Kœmpher, who discovered it in Japan in 1690, and in 1712 published a description, with an excellent figure of the foliage and fruit, in his work on that empire. He had found the tree in temple gardens, and believed that it was Japanese, for early European botanists in Japan had to do most of their botanizing in gardens, and did not realize that many of the most popular Japanese garden plants had been brought from China with the Buddhist religion. Among these introductions was the *Ginkgo*, which grows nowhere indigenously in Japan, although it is now found in most temple gardens, both in China and Japan; and it is possible that this once widely distributed type has only been preserved by cultivation, for if we are not mistaken the *Ginkgo* is nowhere known in a wild state. The unusual power of this tree to bear cold and drought would indicate that it had long inhabited some region with a severe continental climate, and if it exists now at all outside of gardens it is probably in some of the elevated districts of western China or of Mongolia, or on the still unexplored mountains of northern Corea.

In old Japanese temple gardens the *Ginkgo* is frequently one hundred and twenty feet high, with a tall massive trunk six or seven feet in diameter and large drooping limbs sweeping out in wide-spreading graceful curves, and furnished with elongated, leafy lateral branches. Such trees are splendid and impressive objects, especially in autumn, when the leaves which flutter on their long stems become the color of gold. *Ginkgo biloba*, which is also sometimes called *Salisburia*, and by English-speaking people the Maiden-hair Tree, from the resemblance in the shape of its leaves to the pinnæ of the common Maidenhair Fern, was introduced into the Botanic Garden at Utrecht about 1730. Twenty years later it found its way to England, and in 1784 was introduced into the United States by Mr. William Hamilton, who brought many exotic trees, including the Lombardy Poplar, into this country, planting them in his garden at Woodlawn, near Philadelphia, which, a century ago, contained the richest and most famous collection of plants in America. A male tree flowered in England as early as 1795, but it was nearly twenty years later before female flowers were seen, De Candolle discovering them in 1814 on a tree at Bourdigny, near Geneva. Scions from this tree grafted on a staminate plant produced in 1835 perfect fruits in the Botanic Garden at Montpellier; and fruit-bearing trees are now comparatively common in Europe; in

the United States they exist in Central Park, New York, in Germantown, Pennsylvania, near Louisville, Kentucky, and probably in many other localities, as the Ginkgo of late years has become a comparatively common ornamental tree in this country.

Stiff and almost grotesque in its early years, with slender, remote, wide-spreading branches and sparse foliage, the Ginkgo does not assume its real character until it is more than a century old. There are few trees whose youth gives so little indication of future splendor; and so little picturesque is the Ginkgo in early life, and so badly does it blend with American surroundings that a great landscape gardener, knowing only young trees, declared that it could have no place in our landscape planting. If, on a bright November day, he had seen the great trees in Kamakura, or in the gardens of Asakura, in Tōkyō, he would certainly have recognized the great possibilities of the Ginkgo for picturesque planting. In the United States the Ginkgo is perfectly hardy as far north as Massachusetts, and thrives as well in the south as it does at the north. There are not, however, yet any very large or fine specimens in this country, although the tree planted nearly a century ago in the garden at Hyde Park, on the Hudson River, has begun to assume mature habit and shows that later generations may hope to see eastern America rival eastern Asia in its Ginkgo trees.

The Ginkgo is very easily raised from seeds, which can now often be purchased from dealers and which retain their vitality for several months, and female plants, which are less common than males, may be obtained by grafting; it is easily transplanted and thrives in deep, rich drained soil, in which it will often increase in height from two to three feet in a year. Nurserymen propagate a variety with leaves which are larger and more deeply divided than normal, and others with slightly pendulous branches and with leaves striped or blotched with yellow, but none of these varieties have much to recommend them.

The yellow flesh of the Ginkgo fruit has a most disagreeable, rancid flavor, but the seed-kernel, which resembles the kernel of the Almond, is sweet and palatable. In China the trees are cultivated for their fruit, which is sold in great quantities in all markets, but in Japan, where the fruit is also gathered and sold, the trees are cultivated for ornament only, and usually only in temple gardens. The wood is bright yellow with a close compact grain, and is capable of receiving a beautiful polish; it is, however, soft and easily broken, and is not considered particularly valuable.

The Ginkgo is certainly one of the most interesting, hardiest and most picturesque trees which have been introduced into the United States, and if a man wants to plant for posterity, for it must not be forgotten that it has taken from five hundred to one thousand years to build up the great Ginkgos of Japanese and Chinese temple gardens, he is reasonably safe in selecting this tree for his purpose.

Cephalotaxus is a genus of small trees and shrubs with spirally arranged linear, sharp-pointed dark green leaves twisted on lateral branches into an apparently two-ranked arrangement, dioecious flowers, in stalked axillary heads, the staminate numerous, clustered and capitate, the pistillate in terminal spikes, and drupe-like fruit, similar to that of the Ginkgo. The genus is Asiatic, and its half-dozen still badly defined species are scattered from Japan and northern China to the eastern Himalayas.

The species most frequently seen in our gardens and the only one well known here, *Cephalotaxus drupacea*, is a native of Japan and probably also of northern China. In Japan it is generally scattered through mountain forests, extending northward to central Yezo, where it grows on low hills as an undershrub two or three feet high of the deciduous forest, while on the Hakone Mountains, in Hondo, it becomes a bushy, shapely tree, often twenty-five feet in height. *Cephalotaxus drupacea* is generally hardy in the eastern states, although it frequently suffers in severe winters in New England. Near New York and Philadelphia, where it is more flourishing, it produces fruit abundantly, although in

this country it remains shrubby in habit and is really more interesting as a type of a peculiar genus than it is as an ornamental plant. *Cephalotaxus drupacea* was sent to the Botanic Garden at Lyden by Von Siebold in 1829. He described another species, *Cephalotaxus pedunculata*, a very obscure plant and, perhaps, a garden form of *C. drupacea*, from which it seems to vary chiefly in its longer leaves, or a Chinese species, as there is apparently but one *Cephalotaxus* growing wild in Japan. I have not seen it in our gardens. There is what is believed to be a Japanese fastigate form of this plant in gardens (var. *fastigiata*) with branches as erect as those of the Irish Yew and very dark green foliage; not hardy in eastern New England, there are good plants of this form near New York and Philadelphia. This plant is often known in gardens as *Podocarpus Korai-anus*, *Taxus Japonica*, *Podocarpus Japonica* and *Cephalotaxus Burgeri*. *Cephalotaxus Fortunei*, a native of northern and central China, is the most beautiful of the cultivated species, with lustrous dark green leaves, pale on the lower surface and three or four inches in length. In Europe this is considered the most desirable of the genus as a garden plant. I do not know it, however, in this country and find no reference to it in American garden literature later than the note nearly thirty years old in Hoopes' *Book of Evergreens*. Like many other north China plants, however, it may be expected to thrive in New England.

The different species of *Cephalotaxus* flourish in deep rich soil and require protection, especially until they are fully established, from the winter sun. C. S. S.

The Hamburg Exposition.

THE Gartenbau Ausstellung, which is now closing at Hamburg, is the largest and most important effort yet made to show the resources of the horticulturist. It was conceived in a broad and generous spirit, and has been carried to a finish with remarkable energy and sagacity. The time and circumstances have been auspicious for a great exhibition. The Germans are feeling the effects of industrial and commercial expansion, and exhibitions may almost be said to be a craze with them. Hamburg is not only an important horticultural centre, but it is one of the greatest marts of the world. It has an immense fleet of ships reaching many countries. This touch with foreign trade has bred a most conspicuous public spirit, without which a horticultural exposition continuing through five months could not have succeeded. The steamship companies transported exhibitions free and the people of Hamburg subscribed for about 70,000 season tickets to the Ausstellung before it had opened its gates.

The exposition is the outgrowth of a local horticultural society, and is under the direction of committees of prominent Hamburg citizens. The state of Hamburg gave 50,000 marks for premiums, and a guarantee fund was raised by subscription. The receipts of the exposition are derived from gate moneys, rent of space, and concessions to restaurants and tradespeople, and have been sufficient to meet all expenditures, to secure the guarantee fund, and to leave a handsome surplus. This happy condition has been brought about, of course, only by the application of the strictest business methods, and yet the intelligent visitor must be impressed with the liberality of the management and the courtesy and freedom with which it has extended privileges to students and specialists. One is impressed with the fact that while the exposition is a financial success, its motive is, nevertheless, one of public spirit and a desire for the extension of the influence of horticulture.

The site of the exposition is ideal. A public park of about thirty-five acres, splendidly diversified with hill and dale, glade and wood, water and sward, has been made an Eden of color. The effects of herbaceous plants are naturally paramount. Dahlias, Geraniums, Lilies, Gladioli, Azaleas, Rhododendrons, Roses, tree Fuchsias, burning carpet beds, have been some of the most conspicuous

features of the outdoor displays. The greater number of exhibitors have been Germans, but there has been conspicuous coöperation on the part of Belgians, English, Italians, French and other nationalities. America has been represented by but few displays, the most prominent being a very large and fine exhibit of evaporated and prepared fruits from California, and displays of various florist's stock by W. A. Manda. The Americans have certainly lost a distinct opportunity to push their fruit and inventions into European markets. We are looking to Europe to consume our apples and evaporated and canned fruits, and cranberries and other fruits must eventually find an outlet there. The authorities of the exposition urged the Americans to exhibit, and certain Americans endeavored to second their efforts. The apathy of our people in this matter does not speak well for the much-vaunted American thrift. The influx of American apples into Germany last year has thoroughly aroused the people there, and the pomological display at Hamburg represented the abundance and excellence of the fruits of Germany and the Tyrol. The effort was made largely for the purpose of showing that the pomological resources of the Old World are competent to meet the advances of the New World. A thousand barrels of American apples and twenty-five barrels of American cranberries should have been placed in storage in Hamburg in 1896, and the entire course of the exposition should have seen these products on exhibition, and every public function should have seen them supplied to the tables. It would be inexcusable if another great European exhibition should be so completely ignored by the American public.

While the Austellung has been a continuous display from the first of May until the early part of October, there have been several great events, of which the spring exhibition, the autumn exhibition and the pomological display have been chief. The autumn show (Herbst-Austellung), opening late in August and lasting a week, was undoubtedly the grandest display of plants and flowers ever made. Over five hundred exhibitors were represented, and others were turned away because of lack of room. It would be futile to attempt to designate particular exhibits of great merit, but one could not help observing the great Palm exhibit of Winter, of Brodighera, Italy, the choice and rare plants of Sanders, the incomparable Gladioli of Lemoine, and the prodigal display of cut bloom by the Erfurter Handelsgärtner. The Erfurt display received the Laeisz prize of one thousand marks for cut flowers. Prominent features in this display were China Asters, tuberous Begonias, Gladioli, Marigolds, Petunias, Dahlias, Verbenas, Pansies, Zinnias, Celosias, Immortelles and Phloxes.

Dahlias were profuse in the autumn display. Many exhibits were permanent plantations in the grounds, but not all of these were successful. It was apparent—as it is to all Dahlia growers—that soil, season and date of planting exert most powerful influence upon the prolificacy and character of bloom. In the Dahlia plantations the Cactus and single classes were deservedly most popular. Matchless was, perhaps, the leading variety. Three novelties deserve special mention for great individuality and merit: *Perle de la tête d'Or* (an unfortunate name for a white variety) is a most beautiful clear white semi-Cactus French novelty, of good habit and very floriferous, larger than Matchless, and, to my taste, the best introduced novelty displayed at the exposition; Cannell's Gem, a very fine salmon-red Cactus Dahlia; Stölzer Riese, a large and broad-rayed single, with very long stems, maroon-claret shading to rose. The hauptpreis of 100 marks was awarded to a collection of cut Dahlias comprising 800 varieties. Two striking novelties exhibited as cut blooms were Loreley, a large shell-pink Cactus, and Hohenzollern, a very large salmon-buff Cactus. The former is to be introduced in 1898, and the latter in 1899. Cannas were poor, and none of the prizes offered for novelties were awarded. This does not prove that the novelties may not have had distinct merit, but they did not reach expectations in the grounds at Hamburg, a circum-

stance which may have been due to soil, lateness of planting, or other local causes.

The merit of the Austellung lay quite as much in its general plan and effect as in the technical details, and it was this general character which contributed mostly to its wonderful financial success. Thousands of persons who are not interested in horticulture itself must have been touched with the possibilities of the art by visiting the exposition, and must have received an insatiable desire to enjoy the beauties of plants and to introduce them into their own homes.

Cornell University.

L. H. Bailey.

Foreign Correspondence.

London Letter.

HIBISCUS MANIHOT.—When treated as a greenhouse plant this old annual species of *Hibiscus* grows to about a yard in height, and is pyramidal shape, clothed with palmately-lobed, dark green, smooth leaves about six inches long, and produces in autumn handsome cup-shaped flowers, five inches in diameter, colored golden-yellow with purple centre. It is a native of China, but has long been naturalized in Bengal, and is commonly cultivated in tropical countries. It was introduced into English gardens nearly two hundred years ago, and has been tried as a summer bedding plant. Recently it has attracted attention through some plants that were sent to a meeting of the Royal Horticultural Society by Mr. Lambert, of Cookham, who sowed the seeds in heat in February and grew the plants outside in summer. They were shown in August, and received an award of merit.

LILIUM HARRISII.—The Bermuda Lily is an extremely popular garden plant in this country, large quantities of the bulbs being annually imported from Bermuda, where they are grown in fields for the American and European markets, the annual output being estimated of the value of £20,000. The appearance of a fungoid disease in the fields there has somewhat crippled the industry, still quantities of the bulbs are being received from Bermuda now, full-sized bulbs realizing about fifty shillings a hundred. This bulb is also being grown on a large scale in Natal, from whence an experimental importation was received in London in April last and sold by auction. These were equal in size and quality to the best samples from Bermuda. Two hundred were secured for Kew, and were planted in pots and placed on a cinder bed in the open air. They grew and flowered perfectly in August and September, and proved most valuable for open-air beds and in the conservatory. The Bermuda bulbs flower in April and May.

MACROZAMIA SPIRALIS.—Of the numerous species of *Macrozamia* that have been introduced from Australia this is the most useful for ordinary garden purposes, as it grows freely and soon forms an elegant pot-plant. Its dark lustrous green fronds are plumose, and it is almost as graceful as *Cocos Weddelliana*. It is being grown in quantity by one of our leading market growers, who imported seeds of it from Australia, and is now offering it under the name of *Zamia elegans*. All the *Macrozamia*s are ornamental, but they do not all grow freely. *M. spiralis* is the type of a group of species which in stem and foliage closely resemble each other, namely, *M. Fraseri*, *M. Moorei*, *M. corallipes* and *M. Dyeri*. These are all grown in the stoves at Kew. *M. Fraseri* is abundant in Victoria, often occupying large areas, generally where the soil is poor. It sometimes forms a thick trunk six feet high. These stems are easily imported, and seldom fail to grow with ordinary care. A few years ago I bought for sixty shillings two stems, each of which weighed half a hundredweight. These are now handsome specimens in the Palm-house at Kew.

BOUGAINVILLEA GLABRA SANDERIANÆ.—I lately saw some beautiful examples of this plant which had been treated differently from the usual method. Cuttings had been struck and the plants grown on in heat, but the shoots were kept pinched until a shrub a yard high had been formed.

After two years of this treatment the shoots were allowed to grow, but as the plants were in eight-inch pots the growth was not too vigorous. By July handsome irregular bushes had been formed and flower-buds showed in abundance. The plants were then placed outside, where during August and September they were beautiful objects, being heavily laden with flowers several shades deeper in color than those produced under glass. I believe this plant might be grown to flower on a south wall outside in summer.

ABERIA CAFFRA.—This, the Kei-apple of south Africa, is again receiving attention, being recommended as a hedge plant for subtropical countries, and its fruit for making jam. It has long been grown for both purposes in south Africa, and I remember seeing about ten years ago a fine hedge fence of it along one side of the Grahamstown Botanic Gardens, thicker and stronger than the stoutest quick hedge and, with its long stout thorns, forming an almost impenetrable barrier to all kinds of animals. It is used

fruit as there is "meat" in an ostrich-egg, is soft, white, sweet and agreeable to the taste. The small black seeds, although numerous, are no detriment, as they are soft and tasteless. There appears to be at least two forms of the plant, one having fruits only about half as large as those produced at Kew. In such states as Mexico and Florida this plant would, no doubt, grow vigorously and fruit freely without much trouble.

NICOTIANA TOMENTOSA VARIEGATA.—The type, better known under the name of *Nicotiana colossea*, is one of the handsomest of large-leaved plants for subtropical bedding, for which purpose it is superior to the *Wigandia*. It is now largely grown in English and French gardens, attaining a height of six or eight feet in a season, with leaves a yard or more long and two feet wide. It was introduced from Brazil about ten years ago. I lately saw in the nursery of Monsieur Sallier, in Paris, some plants of a variety which were remarkable for the richness of their variegation. They



Fig. 50.—Gardens of Penshurst Place.—See page 389.

in New Zealand, where, according to the *Waikato Times*, it forms a sturdy, short-jointed grower, an evergreen with thorns six inches long, which are a perfect terror to evil doers, be they beasts or human beings. It fruits freely, and the fruits are of the size of green-gage plums. Professor Macowan, of Cape Town, says of the fruits that although few people like to eat them raw, they make first-rate jam. He recommends a mixture of Kei-apple with tomato as a good jam. This plant fruits freely in the garden of Mr. T. Hanbury, at Mentone, on the Riviera.

CEREUS TRIANGULARIS.—An old plant of this night-flowering Cactus has, this year, fruited at Kew, and the fruits are so large and handsome, and moreover so palatable, that cultivators might do worse than turn their attention to this plant as a fruit producer. The fruit is as large as an ostrich-egg and weighs two pounds; it is of a bright rosy crimson when ripe, and the pulp, of which there is as much in each

were more than a yard high, very leafy, the leaves large and their color soft green with a broad, irregular band of creamy white, most of the leaves being more white than green. It comes true from seeds. It also may be propagated from cuttings. It grows with great vigor in the open air, colors without fail, no matter how strong the growth, and it does not burn in bright sunshine.

BEDDING BEGONIAS.—The best bedding varieties among the tuberous varieties that I have seen this year are the following: Lafayette, scarlet; Major Hope, pink; Julia Marnier, yellow; Madame E. Turtle, white; Virginia Vanchon, pink and yellow. These are all dwarf and compact, with small leaves, and the flowers stand well up on stout stalks. Their colors are clear and good. Beds of these in the flower garden are as effective as those of the best *Pelargoniums*.

London.

W. Watson.

Entomological.

A Willow Pest.

THE destructive Willow-borer, *Cryptorhynchus lapathi*, is another insect which has found its way from the Old to the New World, and has now become well established in its new home. The first published notice of its appearance in this country seems to be that given by William Juelich in *Entomologica Americana* for 1887 (vol. iii., page 123), who says in that year he found it infesting a Willow in West Bergen, New Jersey, and that five years previously, in 1882, he had found his first specimen in another locality. In the same season it was found in the northern part of New York City. During many years it has been known to occur in Cambridge, Boston and in their vicinity, and for several years it has proved destructive to almost all species of Willows growing in the Arnold Arboretum. It has been found boring in stems of all the native Willows with the exception of a few mountain or very slender-stemmed species which are too small to afford the borers sufficient sustenance or give them tissue enough in which to make their borings. Of the foreign Willows which become large trees, such species as the White Willow, Crack Willow and Laurel-leaved Willow are more or less attacked, but seem to be less liable to serious damage than the Babylonian Weeping Willow. Besides Willows, this borer has been found to attack all the cultivated Poplars in the Arboretum, particularly when these trees are young, and this season it has been rarely found in small plants of two species of Birch, the Dwarf Birch, *Betula pumila*, and the Red or River Birch, *B. nigra*. In Europe it has been reported as boring in Alders. These instances give a hint of the possible increase in the variety of plants upon which the insect might thrive. So abundant is the pest and so extensive its ravages that it is rarely possible to find a good healthy plant among the shrubby Willows in many localities about Boston. In the shrubby species most of the larvæ are found boring in the lower parts of the stems or nearest the ground, but in those which reach the stature of trees the pests are often found in the higher parts of the stem and the higher limbs.

Cryptorhynchus lapathi is a beetle belonging to the great curculio family, which contains thousands of species, and it has been long known in Europe, where it is often mentioned in entomological writings and essays on the culture of Willows. It was described as *Curculio lapathi* by Linnæus, and by later authors placed in the genus *Cryptorhynchus*. Wherever they occur in eastern North America the beetles may be found during July and August on the bark, or sometimes on the foliage of the plants they infest. They are generally not very active in their movements, and when alarmed fold their legs and drop to the ground and remain quiet for a time, in which condition they are not easily seen on account of the fact that their colors and markings harmonize with most soils and débris.

The body varies in different individuals from one-third to three-eighths of an inch, or slightly more, in length. The general color is dull black, with a few very short jet black tufts of bristles or scales upon the wing covers and thorax. Under a magnifying glass the wing covers or elytra are each plainly pitted or indented in ten longitudinal rows, and the thorax is also minutely but irregularly punctured. Scattered over the forward half of the wing covers are numerous minute whitish scales, which are mostly so placed as to form a more or less distinct, broad V-shaped mark, and the tips of the wing covers for about one-third of their length are almost white, with a dense covering of these light-colored scales.

The under side of the abdomen is black or with a few scattered whitish scales upon it, and the sides of the thorax

are densely covered by white scales. The head and proboscis are black, the proboscis usually withdrawn, except when the beetle is active. The legs are black, but marked by numerous white scales disposed either singly or in groups and particularly numerous on the femora, which are usually distinctly whitish on the basal halves of the first pair of legs.

During the summer the eggs are deposited by the beetles in or upon the bark of the Willow or plant attacked; they are hatched soon afterward and the young grubs eat their way into the stem. During the summer and autumn they attain only part of their ultimate growth, remain dormant during winter and continue their boring in spring and reach full size in June or early July. When fully grown the larvæ are between three-eighths and one-half of an inch in length, fleshy, of a dull white color, with brown head and darker mouth parts and an oblong brownish shield on the first segment, back of the head; they are provided with six very short tubercle-like legs on the anterior segments. When fully grown the grubs or borers change to pupæ in their burrows in the wood, and in two or three weeks afterward emerge as beetles. Commonly, larvæ, pupæ and beetles may be found at the same time. Very often the stems of Willows are so riddled by the numerous boring larvæ that there is neither fresh tissue nor sapwood left through which the sap can pass, or old tissue or heart wood to support the stem erect, and death or breaking down follows.

In spring the plants infested are usually indicated by quantities of fine chippings or "sawdust" on the bark or around the base of the stem. Much sap escapes through the holes out of which the sawdust is thrown, and

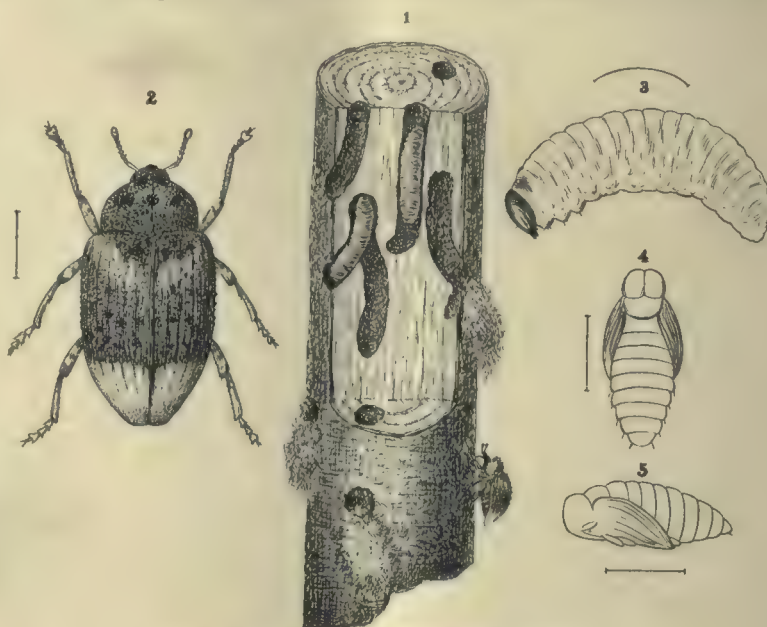


Fig. 51.—A Willow Pest—*Cryptorhynchus lapathi*.

1. Section of infested wood. 2. Beetle (enlarged). 3. Larva (enlarged).
4. Pupa, dorsal view (enlarged). 5. Pupa, side view (enlarged).

sap-loving beetles and other insects are often plentiful on the bark or among the débris.

As to a remedy, the cutting out of all infested parts in spring would seem the best, but as any wild Willows, or even plants of other genera, may harbor the pests the idea of extermination cannot be entertained. Where a few choice plants are to be protected heavy soap washings, applied on the bark in July and August, may prevent egg-laying by the beetles. Some parasites have been observed, and these may help to keep this Willow-borer from becoming unduly abundant. At least eight or ten species of parasites are said to affect this *Cryptorhynchus* in Europe. It is recorded as a native of Siberia and other parts of northern Asia as well as Europe.

The above figure has been made by Mr. C. E. Faxon.

Arnold Arboretum, Jamaica Plain, Mass.

J. G. Jack.

Cultural Department.

Some Autumn Flowers.

KNIPHOFIA NELSONI proves to be a fine addition to the lengthening list of Tritomas. It is distinct in having narrow foliage and small flower-spikes with most intense coloring, the latter a desirable feature in a Red-hot Poker-plant. This variety is the best of the smaller kinds, and specially useful in the front row. Like most of the Kniphofias, it probably would not survive an ordinary winter outside. If it were not for this lack of hardiness these would be much more desirable plants; but in a large collection of plants and bulbs there is such a continuous lifting and replanting through the year that the operation seems less troublesome than when only some odd plant requires this care.

Aconitum autumnale, while an old plant, is so neat in finish, both of foliage and flower, that it seems well again to say that it flowers at about two feet in height, with very dark shining leaves and plentiful purple-hooded flowers. It is perfectly hardy, never affected by insects, and may be ranked among the few best autumn-flowering plants. The best of all autumn-flowering plants is the white variety of *Anemone Japonica*, which is not only beautiful, but is in every way desirable. It occasionally disappears in winter, though it is usually reliable.

Asters are such common flowers in the fields and meadows that many growers do not fully appreciate their beauty in gardens at this season. They flourish under cultivation, and though they do not give large flowers the plants become more branched than when struggling for existence, and produce a multitude of attractive blooms. The British give names to the different garden forms, and these added to the numerous species make an endless variety if the cultivator desires a collection. All the plant-nurseries furnish an assortment, seldom properly named, or one can pick up promising kinds in wanderings afield. It must be said, however, that Asters are seed-bearers, and have capacity for taking possession of a garden. The white *Boltonia asteroides* is quite the prettiest of the Aster family for that color, though its flowers are not the largest. Their effect is Aster-like, though the botanist allies them with the *Stenactis*.

Elizabeth, N. J.

J. N. Gerard.

THE mild weather is prolonging the season for autumn flowers. *Sedum spectabilis* is just now showy with large umbels of pink flowers. This plant may be increased from cuttings at almost any time, and even flower-stems placed in four-inch pots take root and make nice plants for conservatory decoration. The pretty purple-flowered *Plumbago Larpentæ* is one of the best rock-plants. It makes a healthy-looking mat of foliage and blooms from June onward in a sunny position. *Statice latifolia* is one of the best of the Sea Lavenders, and the sprays of small flowers with persistent blue-colored bracts remain for a long time in perfection; in fact, these plants are scarcely ever out of bloom from midsummer until frost. *Silphium terebinthinaceum*, the Prairie Dock, is a majestic plant for the shrubbery border or wild garden. The whole plant is glaucous, and the large leaves, with deeply indented margins, are nearly all basal. The stems rise to eight or ten feet in immense cymes with large starry yellow flowers. Tall plants of *Boltonia latisquama* and *B. asteroides* held together by a stout cord look like immense wheat-sheaves; these are covered with small pink and white Aster-like flowers. *Aster amelloides* is one of the best of the dwarf kinds, with large violet-blue flowers. *Salvia Pitcheri*, with long spikes of deep blue, is highly effective just now. The single *Helianthus multiflorus* is worthy of more extended culture. I have always doubted whether this is the type of the double *Helianthus* commonly seen; the single form is hardier. *Geranium sanguineum* attracts general attention; it is never untidy and always in bloom. The white-flowered *Eupatorium ageratoides* and *E. coelestinum* both suggest the common *Ageratum*. They are among the best of our hardy border plants. Add to these *Pyrethrum uliginosum*, *Anemone Japonica* (pink and white), the Kniphofias or Tritomas and *Funkia subcordata*, and we have quite a list of flowering plants for an autumn garden.

Wellesley, Mass.

T. D. Hatfield.

Phloxes (Decussata section).

THE perennial varieties of these Phloxes, of which *P. paniculata* appears to be the principal progenitor, are among the most useful and satisfactory of our garden plants. They have justly received considerable attention from hybridizers of late years and rapid strides have been made in their im-

provement, both in the size and substance of the individual flowers as well as in size of truss. Several new shades have been added and the flowers now range through different tints of red, rose, carmine and purple, and even the white sorts are more nearly pure white than the older varieties. Among the white varieties selfs are most abundant. The majority of the other shades have the eye of a brighter or darker shade than the ground color of the flower. A few of the best white varieties are White Queen, Jennie D'Arc, White Lady and The Perle. Marie Stuart and Miss Lingard, two excellent varieties, are both white, with pink eye. In the rose section, Lothair and Puritan are both good. Sir E. Landseer is one of the best representatives of the carmine section, while Albatross is probably the best of all the purples. In the brighter, or red section, Aurora Boreale and J. H. Slocum are both good varieties. But their variety is so great that it is needless to enumerate more.

It has been said that Phloxes are plants of the easiest cultivation and do well with very little care. We have always found that they respond quickly to generous treatment, and if provided with a moderately enriched soil, plenty of water when necessary and a good mulching in winter they will more than repay this extra attention by the increased number and larger trusses of flowers. Whether planted in the shrubbery, herbaceous border or in beds by themselves, Phloxes always show to good advantage. They are also useful for cutting, and some of the varieties are highly scented. Sometimes it is complained that their peculiarly sweet odor becomes oppressive in a close room.

The most convenient method of propagation is by division of the crowns, and the scarcer varieties may be propagated by cuttings made from the young shoots. Phloxes are readily propagated from seed, which, however, produce variable results, seedlings seldom coming true to name. Seeds should be sown in the greenhouse in fall, and will in most cases give plants strong enough to produce flowers the following season. We seldom allow them to bloom much the first season, and prefer to cut the flowers off after they have shown their color. They are thus encouraged to make good plants for another season.

Tarrytown, N. Y.

William Scott.

Chrysanthemums.

CHRYSANTHEMUMS which have been growing out-of-doors should be housed by the end of September. They may, of course, remain out until frost is threatened, but nothing is gained by the delay. From the first of October onward a little fire-heat will be found beneficial, as the atmosphere is thus kept dry and mildew prevented. With fire-heat a little air may be left on at the top. While it is necessary to admit an abundance of air, side draughts must be guarded against. All dead or diseased leaves should be carefully picked off, and if, as often happens, thrips attack the lower leaves, a mixture of sulphur and tobacco-water may be used; this serves at once as a fungicide and insecticide. Insects do not like soot, and I have found it efficacious when used with tobacco-water.

Disbudding must be thoroughly done as soon as the buds can be handled, and larger and better-formed flowers will follow. Many small shoots come up through the middle of the plants which will never become tall enough to be on a level with the other branches. In recent years I have pruned these out, and more air and strength are thus afforded to those remaining.

The month succeeding the middle of October is a time full of interest to growers of specimen plants. It is also one of anxiety, for there is yet opportunity to undo a whole season's work by a single blunder. Less and less water will be required as the buds mature, but never so little that the foliage wilts. The roots may be injured by excessive watering, and a serious loss of leaves follows; no treatment will repair this damage.

If the plants are intended for exhibition the date set is too late for some varieties, and these must be held in check. Such plants should be moved to a cooler shady house if possible, otherwise they must be shaded with tissue paper, especially the pink-flowered varieties. Last season I kept a plant of Joseph H. White without injury an entire week in a light position in a barn cellar. Chrysanthemums do not bear forcing well, in the ordinary way of increasing the amount of heat. Plants housed and others placed in cold frames show no difference in time of blooming. Plants of tender varieties which have been grown indoors during the summer, may be set out for a few days in September for the purpose of checking the growth and to encourage formation of flower-buds.

Wellesley, Mass.

T. D. H.

Tamarix Chinensis.

BUT few really good autumn-flowering shrubs are hardy and suitable for this climate, and those that are available are not used to the extent which their merits warrant. The beauty of *Tamarix Chinensis* is strikingly displayed in an isolated clump grown where it shows to advantage, and this beautiful plant deserves more general recognition. The whole genus of *Tamarix* is beautiful. There is great similarity in the species, but some flower in early summer, while the season is prolonged until late September by *T. Chinensis*. *Tamarix*-plants are known as being valuable for seaside planting, owing to their ability to endure the saline atmosphere, and they are used to a limited extent in such situations. But their requirements are not by any means fastidious; any soil will suit them, and we have found them perfectly hardy, even young plants surviving severe winters.

It has been objected that these shrubs soon become bare at the base, and this is true of many plants that are not cared for properly. But there is no real objection to *Tamarix*-plants if they are cut back frequently near to the base in spring before they start to grow. Indeed, this is the best possible way to obtain strong shoots with large terminal panicles of the pretty rosy pink flowers; when thus treated the shoots start at once from the base, and often attain to great height by the end of summer. This method applies only to the spring-flowering kinds. Those that flower in early summer, as *T. tetrandra*, should be cut back after the flowering season, in common with all early-flowering shrubs. Too often in small suburban gardens all the shrubby plants are sheared over until they are shaped like more or less symmetrical peg-tops, and all the promise of bloom is shorn off. Inexperienced men will do this sort of shearing as long as the owners are ignorant of the needs of plants, and those who do this kind of pruning are perhaps less to blame than the persons who employ them.

Tamarix Chinensis is admitted to be the best of the genus, and is found in some lists as *T. Japonica* and also *T. plumosa*; the latter name is suggested by the dense, plume-like habit of growth and panicles of flowers, which are bright pink in the buds and turn to paler pink on expanding.

We have found this genus extremely easy of propagation. It is an easy matter at pruning-time to cut the smaller twiggy growths into lengths of a foot and put them into the open border the greater part of their length. Most of these will grow if the season is favorable. If a greenhouse is available the cuttings may be inserted in pots earlier in spring, and the plants thus started will be much stronger at the end of the first season and should flower the second year.

In the year 1893 Monsieur Lemoine sent out a new species called *Tamarix Kaschgarica*, which he raised from seeds collected in central Asia. This flowers in September and has proved to be a good and distinct plant. It was afterward found to be but a form of *T. hispida*, which has a very wide range geographically. Indeed, the genus has a very wide distribution. *T. Gallica* is found all along the Atlantic shore of France; *T. Indica* is a native of the East Indies; *T. tetrandra* comes from the Crimea; *T. Germanica* is distributed over a great portion of Europe, among the mountains and along the river banks. All of these species are considered hardy in the eastern states, and all are worthy of a place in gardens, especially where saline or alkaline conditions exist, and where it is difficult to make other plants grow.

South Lancaster, Mass.

E. O. Orpet.

Correspondence.

Notes from my Wild Flower Garden.

To the Editor of GARDEN AND FOREST:

Sir,—I have been much interested in articles in recent numbers of GARDEN AND FOREST regarding the cultivation of native plants, for my wild-flower plot has afforded me more pleasure than any other collection of plants.

I wish to suggest the Cranberry-tree, *Viburnum Opulus*, for planting in the home grounds. The flat cymes are bordered with larger sterile flowers similar to those of the wild *Hydrangea*, and while less showy than those of its cultivated form, the garden Snowball, are truly handsome. I was first impressed with their beauty on seeing a wreath composed wholly of them. The bush is compact and symmetrical in growth, the leaves glossy and untouched by the "curl," which so often distorts those of the Snowball, and the deep coral berries are not only ornamental, but their sprightly taste is much relished by some as a substitute for the cranberry. It is said

that old hunters and trappers classify berries "smooth as glass beads" as poisonous; those with a rough point or outward turned surface as harmless; the Poison Ivy and Nightshade are cited as familiar illustrations of the former, the Rose, Whortleberry, etc., of the latter class. The Cranberry-tree furnishes a striking exception to this rule.

The Spikenard is ornamental when in fruit. Its great clusters of berries in early autumn show a rather unusual blending of rich purple clusters resting among others of clear green. Later all are uniformly dyed in the royal colors. Like so many of our native plants with real or reputed medicinal value, this plant is being rapidly exterminated from its native haunts. The ease with which it adapts itself to garden culture will happily prevent its extinction.

The tall Meadow Rue, which dropped its creamy sterile flowers several weeks ago, still retains the fresh green pedicels, giving to the plant a somewhat plumose appearance when seen from a distance. *Viola striata* has bloomed more or less all summer, and now (September 13th) has several blossoms. *Ruellia ciliosa*, which is not indigenous, but transplanted from the western prairies, has proved highly satisfactory, its chief merit being in its constant, rather than profuse, floral display during the midsummer months.

Coronilla varia, also a non-resident of this locality, was transplanted from New England a half-decade ago, and finds place in a spot left bare in summer by the dying down of Hyacinths and Tulips. At first its growth was slow, but finally it entered into a combination with its neighbors, Lily-of-the-valley and *Trifolium procumbens*, the latter also a stranger in these parts, and the trio soon had full possession of the ground. Last year all were removed to the base of a neighboring tree, where they grow as they wish. But the subterranean growth of the *Coronilla* quite surprised us, and though we tried to get it out entirely, thrifty plants still appear from time to time on the old site and suggest its vitality when once established. The delicate foliage and dainty blossoms are much admired in their place, but they should not be planted in beds of spring-blooming bulbs.

The wild Yam, *Dioscorea villosa*, and Moonseed, *Menispermum Canadense*, are admirable; both have clean, glossy leaves, the venation and cut of which are in decided contrast. The outline of the Moonseed is decidedly unique, and once seen will be readily recognized. My plant flowers freely, producing only sterile flowers. Its growth is much more rapid and robust than that of the Yam.

Some one has described *Apios tuberosa* as valueless, but while the blossoms are not showy, their form and color are pleasing. The plant grows rapidly and blooms profusely, and many exotics are not nearly so desirable.

Harmonsburg, Penna.

Bessie L. Putnam.

Meetings of Societies.

The American Forestry Association.

THE special autumn meeting of the American Forestry Association, with attendant excursions, was concluded at Nashville, Tennessee, on September 22d, 1897. The plan of combining excursions to special points of interest as joint features of the meeting, proved to be most interesting and valuable, and reflects special credit upon the gentleman in charge of arrangements. It is to be regretted that a larger number of members could not attend, and only fifteen were present for the entire trip. The excursion party met at Washington on the evening of the 16th, en route for Biltmore, North Carolina, the first point of interest. Carriages were waiting and the party was taken in charge by Dr. C. A. Schenck, head-forester of the Biltmore estate. Dr. Schenck thoughtfully supplied each member with a printed catalogue describing all the forest compartments of the estate to be visited, the short history of which could be quickly read as each numbered section was passed. An inspecting tour of the various forestry operations now under way at Biltmore was directed by Dr. Schenck. The large tract of old farm fields, together with mountain, brush and forest land comprising some 13,000 acres, affords the largest opportunity for the application of European forestry principles and practice, with which Dr. Schenck is thoroughly conversant and laboring zealously to apply to American conditions. We cannot pass over the elaborate preparations and pains taken by Dr. Schenck to make the association's visit both profitable and felicitous. Special temporary foot-paths were cut through the brush, weeds and forest growths, by which certain forestry operations could be more easily reached and viewed. Various methods and stages of regeneration were exhibited, including direct planting of seed

and transplanted seedlings consisting chiefly of Oaks, Chestnut, Ashes, Black Cherry, Tulip-poplar, Maples and White Pine. The party was also taken through a number of natural forests in which was explained the evils of the common and the value of the correct method of cutting and taking out useful and ripe timber without the usual damage to young growing stock. In still other plats the practical effect of inter-lucation on natural regeneration was exhibited. Well-stocked forest nurseries and seed-beds conveniently located were visited and the methods of producing young stock for plantations duly explained. At the conclusion of a hasty survey of these interesting operations the party was conducted to the home of Dr. Schenck, which is pleasantly situated on one of the many hills overlooking the broad valleys and distant mountains, and combining in its immediate surroundings and furnishings a forester's ideal home. The visitors were cordially welcomed by Mrs. Schenck and hospitably entertained.

An evening session of the association was held at Battery Park Hotel, the chief feature of which was an address by Dr. Schenck on Forest Finance. The address was confined strictly to the money aspect and profits of forestry operations and was lucidly set forth. The paper was concluded by an elaborate exposition of charts, photographs and sections of trees, illustrating studies in the current and annual growth of important timber-trees in the Biltmore forests. Numerous specimens of lumber and other wood products of the estate were shown as examples of the available timber supplies, together with various tools and appliances used in silviculture. The members were provided with a neatly printed pamphlet containing Dr. Schenck's address in brief form.

In the absence of Mr. M. V. Richards, Land Agent of the Southern Railway, who was to address the meeting, a short paper was read for him by his representative, Mr. James H. Best. The paper was devoted to a general rehearsal of the manifold uses of various classes of woods, with an earnest plea for the preservation of the southern forests. The meeting was concluded by a vote of thanks to Dr. Schenck for his elaborate preparations in behalf of the association meeting.

The morning of the 18th was spent in another visit to Biltmore, in which Dr. Schenck took the party over portions of the estate not seen the previous day, pointing out the agricultural and horticultural operations, also forest road-building, retention of washed lands and other general features.

At midday the party left for Chattanooga, Tennessee, where it took quarters at the famous Lookout Mountain Hotel. The following day was spent in an excursion to the battle-grounds of the vicinity, Missionary Ridge and Chickamauga Park, and a part of Monday in examining the forest growth and other points of interest on Lookout Mountain. Through the courteous attention of Mr. B. L. Goulding, Secretary of the Chattanooga Chamber of Commerce, the pleasure and interest of the visit to Chattanooga were greatly enhanced. Taking train from Chattanooga, the party reached Nashville Monday evening, and spent the following day in sight-seeing and visiting the Exposition grounds.

On Wednesday, September 22d, the principal meeting of the association was called to order at 10.30 o'clock, A. M., in the assembly hall of the Children's Building, Colonel E. C. McDowell, of Nashville, presided and opened the meeting with a few remarks upon the great need of some forest policy for regenerating the rapidly disappearing supply of southern timber, adding the hope that the present meeting of the association would stimulate local interest in so important a movement. In the absence of Major J. W. Thomas, of Nashville, who was to have given an address of welcome on behalf of the city and Exposition, Colonel J. B. Killebrew was introduced as Major Thomas' representative. Colonel Killebrew gave a warm and cordial welcome to the members of the association, touching upon the forest needs and resources of Tennessee. The Vice-President of the association, Mr. J. D. W. French, responded to the address of welcome, and spoke at some length upon the great need of legislative action toward the protection and administration of public and private forests. He cited the private estate of Mr. Vanderbilt as a fitting example of what should be undertaken on a more extensive scale by state and national government. Colonel McDowell then resigned the chair to Mr. French, who proceeded with the programme. Mr. George B. Sudworth next read a paper on the Forest Flora and Conditions of Middle and East Tennessee. The paper was devoted to the general forest, soil and topographical features of the middle and eastern divisions of Tennessee, with a detailed account of the most important timber species of the various regions, and with special reference to their relative abundance, economic character, development and means of natural regeneration.

Colonel J. B. Killebrew followed with a paper on the Forests of Tennessee. Colonel Killebrew dealt with the general features of Tennessee forests, calling attention to the rapid denudation of the past and present, and then gave a survey of the best-timbered counties of the state, with mention of the principal classes of timber cut for lumber and employed for various economic purposes. He reviewed the rise and present rapid increase of wood-working industries of the state, giving statistics of the principal kinds of manufactures, and closed with an earnest expression of the consequent need on the part of the state of some protection against such rapid and wasteful despoliation of the state's most valuable resource. The next paper on the programme was the Effect of Forest Destruction on Water-courses, by Mr. D. W. Baird, of Nashville, in the absence of whom the paper was read by Mr. H. B. Bond, of Nashville. The paper gave a survey of the well-known results of forest denudation at the headwaters of small and large streams, causing a permanent or partial diminution in their supply of water. The afternoon session was called to order by Vice-President D. M. Riordan, of Arizona. The Secretary of the association, Dr. George P. Whittlesey, read a paper on Forests and Rainfall, by Professor H. A. Hazen, of the United States Weather Bureau. Mr. W. W. Ashe, of Raleigh, North Carolina, also read a paper on the Forest Conditions of Iowa, by Professor Thomas H. McBryde, of Iowa. The paper of Mr. George W. Rafter, of Rochester, New York, on Stream-flow in Relation to Forests, was read by title owing to its length and technical character. The remainder of the session was given up to remarks by several members. Mr. D. M. Riordan gave a very lucid and interesting account of the general soil, climatic, topographical and forest conditions of Arizona, with special attention to the San Francisco mountain region. He described the relative position of the various timber and other woody growths from the plateau to the higher elevations, stating that the chief lumber-tree of the San Francisco mountain region is the Bull Pine, or *Pinus ponderosa*. An interesting part of Mr. Riordan's address was the definition of several life zones, and notably the one above 5,500 feet elevation, at which the timber Pine of the region begins to appear in a broad horizontal belt.

Mr. J. W. French again referred to the necessity of general forest legislation, especially in the western states, for the protection of the existing forests, and urged the members of the association to enlist their Congressmen in securing such needed legislation. Mr. D. M. Riordan, in discussing the question, acknowledged the necessity of some stringent laws to control depredators and to protect western forest lands, but called attention to the impossibility, almost absurdity, of a few association members being able to instruct their Congressmen until the communities themselves should reach that understanding of the necessity of forest legislation that they should demand of their representatives the passage of suitable protective measures. At the present time he said the common interest of Arizona communities leads them to oppose all forest protective measures and to look with suspicion or ridicule upon any forest missionary work attempted among them.

Dr. Schenck was called upon for a few remarks and stated briefly that all forestry operations should be viewed only from their money-producing power. Growing forests which would not give a net interest of two to three per cent. on the original and current investment should not be considered up to their proper earning power and should therefore be cut down. He explained the necessity of distinguishing between what must be considered profitable individual and communal or state forest lands, the interests of both ownerships being viewed from different standpoints.

Notes.

A society entitled Société des Sylviculteurs de France et des Colonies is being formed in France for the purpose of diffusing the knowledge of silviculture and increasing popular interest in this art.

Mr. Harlan P. Kelsey, whose address at present is 1123 Tremont Building, Boston, has regained control of the Highlands Nursery at Kawana, North Carolina, and is now prepared to supply the shrubs and other plants of the southern Alleghanies, which are the specialty of this nursery.

New-crop hickory-nuts, which have been on sale here during the past two weeks, have realized \$2.50 a bushel. Chestnuts, in moderate supply, from the Catskills, in this state, and from as far south as Maryland, have sold for as much as \$12.00 a bushel, but within the past few days have rapidly declined in price.

Strings of peppers have quite transformed the usually unsightly fire-escapes of tenement-houses in the Italian colonies during the past fortnight. The glowing scarlet fruits, in various stages of ripening, are freely festooned, and in the bright autumn sunlight lend a distinctly festive appearance to streets usually given over to dull squalor.

Referring to Mr. Watson's note on three varieties of *Victoria regia*, on page 283 of the current volume of *GARDEN AND FOREST*, Mr. E. D. Sturtevant writes us from Los Angeles, California, that the one alluded to as Dixon's variety is known in American gardens as *Victoria Randii*, and was introduced by Mr. Edward S. Rand, of Para, and named in his honor by Mr. Sturtevant.

The orange crop of California for the coming season, according to conservative estimates based on the present condition, will amount to from 7,000 to 8,000 carloads, as against 5,000 carloads last year. As 300 boxes are required to fill a car this means an increase of from 600,000 to 900,000 boxes of this fruit. Other authorities consider 4,500,000 boxes as not too high an estimate for the amount of this season's output. California oranges from last season are still offered in the eastern states in the choicest collections of fruits; and in rich quality these rival Rodi oranges, the celebrated summer fruit from the Mediterranean. Since the first shipments of new crop oranges from the Pacific coast are expected here during November, the likelihood is strong that California oranges will hereafter be in market throughout the entire year.

Iris Leichtlini, figured in a colored plate in *The Garden* of September 18th, is one of the smaller Asiatic Irises of the *Regelia* group and was first flowered in Baden-Baden in 1879. This Iris is one of the most quaintly and daintily marked of these interesting plants. It is perfectly hardy in this latitude without protection, and seems to be longer lived than most of those of the allied *Oncocyclus* group. Their successful culture depends on their having a distinct rest in perfectly dry conditions. They are amenable to cultivation in a cool house, and start naturally into growth at this season, coming into flower in March or April. They must have perfect drainage, as they damp off readily. They are also favorites of aphides. If grown out-of-doors they should be planted late, so that their leaves do not appear above ground before hard weather sets in.

The coöperative enterprise known as the Campbell Fruit-growers' Union, in the Santa Clara Valley, California, was recently described in *The Pacific Rural Press* with interesting details. The Union has done much to systematize and improve methods of handling fruit from the time it leaves the orchard until it reaches the market. The shrinkage of each lot is tested, so that the grower shall receive an exact equivalent according to the curing value of his fruit, as well as according to its size and quality. The cost of grading, curing and packing has been greatly reduced, uniformity in the product has been established, and in many ways the growers who have coöperated to furnish a superior grade of dried fruit are securing a fair share of its market value. Twenty-five tons of fruit are bleached here at one time, and seventeen acres are used for drying the fruit in the sun, a double line of steel railway extending to the most distant portions of the tract. The plant has a capacity for curing 7,000 tons of fruit in a season.

Jonathan apples, from Missouri, are now among the choice offerings of this fruit, and other good varieties of apples are Twenty-ounce, Holland, and Fall Pippins, Maiden's Blush, King, Ben Davis, Baldwin and Greening. Selected hand-picked apples of these varieties cost from \$3.00 to \$5.50 a barrel at retail. The receipts of apples in this city last week amounted to less than 21,000 barrels, and in the corresponding week of 1896 reached nearly 47,000 barrels. Many of the peaches now coming from New Jersey are small and generally undesirable, and these sell for fifty to seventy-five cents for a basket holding five half-pecks, while the highest grades command \$1.50. Besides Seckel and Bartlett pears there are now in market Buerre Bosc, Sheldon, Buerre d'Anjou, Buerre Clairgeau, Swan's Orange and other late sorts. Just after the last huckleberries had disappeared from our markets, and when it seemed certain that the season for summer berries was ended, second-crop strawberries were unexpectedly received by the crate from fields in southern New Jersey. These comparatively limited supplies sold in Washington Market last week at forty-five cents for a quart box. The berries were of medium size, fully ripe and quite showy. Wintergreen berries sell for fifteen cents a quart, and are in considerable favor for eating out of hand. The first Jamaica oranges, well ripened

for so early in the season, reached this port last week in a lot of sixty-one barrels; twenty barrels were at once reshipped to England. Florida oranges were another novelty in this city last week, and sold at high prices. This season's orange crop in that state is estimated at 250,000 boxes. Seventy carloads of California fruits were sold here last week, grapes constituting the bulk of these supplies.

The Smithsonian Institution has undertaken to bring together all available information relating to the medical uses of plants in the United States, and arrangements have been made with the body representing the Pan-American Congress to prepare a report on this subject. A sub-commission for the United States consists of Dr. Valery Havard, United States Army, chairman, Dr. Coville, botanist of the United States Department of Agriculture, Dr. Millsbaugh, curator of the Botanical Department of the Field Columbian Museum of Chicago, Dr. Charles Mohr, of Mobile, Dr. W. P. Wilson, director of the Philadelphia Commercial Museums, and Professor Rusby, of the New York College of Pharmacy, who is also chairman of general commission. This committee solicits information concerning the medical plants in the United States from every one in a position to accord it. All packages and correspondence should be addressed to the Smithsonian Institution at Washington and marked on the outside "Medicinal Plants for the United States National Museum." Franks which will carry specimens, when of suitable size, together with descriptions and notes, free of postage through the mails, will be forwarded upon application. Some of the principal subjects which will occupy the attention of the committee are the local names and uses, geographical distribution and degree of abundance of medical plants; whether they are collected for market, whether they are cultivated or have been, with methods of cultivation, and whether the drugs obtained from them are subject to adulteration. In order to assist in the study of the habits, properties and uses of our medical plants the sub-commission undertakes to furnish the names of any plant specimen received, together with all desired information concerning it available. The sub-commission requests that all plants sent shall be represented by at least four specimens.

The exhibition of flowers, plants, fruits, vegetables and cereals in connection with the sixty-sixth fair of the American Institute of the City of New York, began in Madison Square Garden last week. More than 20,000 Dahlia flowers were staged for competition. In the class which required not less than a hundred varieties and six blooms of each kind, above 300 varieties were shown by W. P. Peacock, Atco, New Jersey, and as many by H. F. Burt, Taunton, Massachusetts. These growers were awarded first and second prizes in this class, and also shared honors in other important classes in competition with other exhibitors. There were exhibits of single, double, pompon and cactus Dahlias by professional and amateur growers. The displays of hardy and half-hardy perennials were especially showy. A. Herrington, gardener for H. McK. Twombly, Esq., Madison, New Jersey, showed some new hybrid Tritomas; among these Star of Baden-Baden was specially good, as was Ophir and H. Cannell. One hundred vases of Gladioli, each holding from six to twelve immense spikes, comprised one of the brilliant exhibits in this unusually good show. These came from John Lewis Childs, Floral Park, New York. Other flowers shown by the same grower were Tritomas, Montbretias, Phloxes and Tuberous Begonias. The new, deeply fringed double Hollyhock, Altoona, was awarded a certificate of merit. Carl Blomberg, gardener for Oakes Ames, Esq., North Easton, Massachusetts, made a large and instructive display of wild flowers and received a first-class certificate for flowers of *Nymphæa cœrulea striata*, never before exhibited, and *N. Eastoniensis*. Besides a large collection of decorative plants, the F. R. Pierson Co., Tarrytown, New York, exhibited a new scarlet Canna, Tarrytown, which received a first-class certificate for intense color, free-flowering qualities and general usefulness. Vegetables of extra quality were shown in large variety by J. M. Thorborn & Co., and one of the most popular exhibits in this remarkably interesting show was a collection of chestnuts, walnuts, hickory-nuts and filberts from the Pomona Nurseries, Parry, New Jersey. The exhibition will continue until October 23d, different classes and exhibits being shown each week.

WILLIAM A. STILES, the editor of this journal, died early this morning, after the main portion of this issue had gone to press.

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William A. Stiles.

WILLIAM AUGUSTUS STILES, the editor of this journal since its conception and its general manager for many years, died at the home of his sister in Jersey City on October 6th, after an illness of several months. He was born in Deckertown, in northern New Jersey, near the Pennsylvania line, on the 9th of March, 1837, where his grandfather had removed in 1819, and was the son of Edward A. Stiles and Evelyn Belmont Howell, members of old and respected New Jersey families. His father, who had been educated for the ministry, opened in 1833 a small private school on his farm near Deckertown, which rapidly grew in size and importance, and when he retired from it thirty years later had become the most important institution of learning in northern New Jersey. In this school William A. Stiles, who as a boy was distinguished for intense love of reading and for proficiency in music and mathematics, was fitted for college. He was graduated with honors from Yale in the class of 1859, and the following year became a teacher in his father's school and began the study of law. His health had never been robust, and his sight, injured in boyhood by excessive reading, now became greatly impaired, and he was obliged to give up his legal projects, and in 1864 went across the Isthmus of Panama to San Francisco in the hope of deriving benefit from the sea voyage. This expectation was more than realized, and on arriving in California he was able to accept a position as teacher in English literature and music in a school in Oakland, but soon abandoned teaching to become a member of the corps of engineers engaged in running the line for the Central Pacific Railroad across the Sierra Nevada. The strain upon his eyes in this employment proved too severe, and after a long illness in San Francisco he returned to New York nearly blind. Gradually recovering, he began to study politics and to write political articles for the newspapers. This led to his appointment as a gauger in the New York Custom House, a position which, although never congenial, he continued to fill for several years, leaving it finally to become a member of the editorial staff of the *New York Tribune*, with which he remained closely connected until his death. In

1880 and in 1883 he was defeated as Republican candidate for the State Senate from Sussex County, New Jersey, and for the three years following his second defeat he served the New Jersey Senate as Secretary.

After his return from California Mr. Stiles became interested in plants and their cultivation on the farm and in the garden, and in urban parks, and began to write about them, his contributions to the daily papers on these subjects attracting much attention, and in 1883 he became, in addition to his editorial duties on the *New York Tribune*, the agricultural editor of the *Philadelphia Press*. When the establishment of a weekly journal devoted to gardening and forestry in this country was decided on, Mr. Stiles was selected as the editor. The readers of GARDEN AND FOREST need not be told how he has performed his difficult task. Every week for nearly ten years they have seen the results of his rare editorial judgment, his literary skill, his good taste and unflagging zeal in advancing the knowledge of the special subjects to which GARDEN AND FOREST is devoted. He has been more, however, than a brilliant and successful editor of a technical journal; keen love of nature and sympathy with the cravings of the poor shut within city walls from the sight and enjoyment of the country made him fully understand the value and true meaning of urban parks, and for twenty years, always with that modesty which was one of his strongest characteristics, but with inflexible purpose, he has stood between the parks of this city and the men who at different times and under different pretenses have tried to deface them. His pen saved Central Park from the speedway which threatened to ruin its rural character and destroy its true value. He preserved for the people the charming sylvan glade where it was proposed to place the menagerie which had become distasteful to some of the wealthy residents on Fifth Avenue, and he made it impossible to use Central Park for the Columbian Exposition. It was his forethought and technical knowledge which have modified and delayed the schemes of the men who in their zeal for a botanic garden are willing to deface, unnecessarily, Bronx Park, and could his life have been prolonged this most valuable and beautiful of all the rural possessions of the city might, perhaps, have been spared for the best enjoyment of the public. These are a few of the conspicuous services which he has performed for the parks of this city, but for years hardly a month has passed in which he has not preserved them from some dangerous invasion. An educator in all that relates to parks, reaching the public ear through the press, which had unbounded confidence in his judgment and integrity of purpose, his service to the people has not been merely local; his example has stimulated and his words have instructed, and now in every American community there are who understand the significance of city parks and the difficulties which those who labor to make them most useful have to encounter.

Mr. Stiles was a man of wide and deep sympathies and of unusual intellectual activity in many directions; he loved Nature in all her aspects, delighting in the beauty of trees and flowers in the forest and in the garden, and in their harmonious arrangement; he loved the song of birds, quiet sylvan lanes and sparkling waters. To few men did music mean so much. The love of it came from his mother, a woman of strong intellect and great refinement, from whom, too, came his ready and brilliant wit and keen perceptions. Music was one of the vital and influential forces of his life, and although in later years he was not, except for his own pleasure, a performer, he knew music thoroughly; and his deep insight and instinct for clear analysis made his musical criticisms a source of unceasing pleasure to those who heard them. Other subjects occupied his thoughts. A constant and profound student of the Bible and truly reverential, he was deeply read, too, in English literature and speculative philosophy. A remarkable mathematician, he found mental recreation in solving the most difficult problems; learned

in agricultural chemistry and the breeding of domestic animals, he kept himself abreast of all the latest advances in the science and practice of agriculture. A politician in the best sense and alive to the dignity of citizenship, he enjoyed the game of politics, as he did a horse race, and no man not a professional was better versed in the technicalities of the baseball field and the football gridiron. Shielding himself behind his invincible modesty, this many-sided man long escaped the publicity which he never sought or desired, but eventually the knowledge of his true value spread beyond his personal friends and associates. Two years ago he was made one of the Park Commissioners of this city, a position for which he was in every way admirably equipped, and gradually the public has learned that he was one of the strongest and most valuable men in this community.

His death is a serious loss to the readers of GARDEN AND FOREST, and to every one in the United States interested in landscape-gardening, horticulture and the care and protection of our national and state forests. To this city at this particular time his death is a great misfortune, for it leaves it without its most intelligent and powerful champion in the constantly recurring fight between the people and the would-be spoilers of their parks. Of his life-long devotion to those nearest to him by blood, untiring in its constancy and tenderness, we must not speak here; nor can we trust ourselves to speak of the faithful friend and associate tried by the test of long years of intimate relations, the wise counsellor and the joyous companion. Men who knew William A. Stiles loved him, and to them his memory will be immortal.

Notes on Cultivated Conifers.—II.

TUMION, or *Torreya* as it is more generally known, is a genus of small trees with elongated lanceolate sharp-pointed alternate leaves spreading in two ranks, and solitary diœcious axillary flowers, the male composed of numerous stamens with filaments dilated above into four anthers connate into a half ring, the female of a single erect ovule surrounded by a fleshy aril which becomes confluent with the woody testa of the seed, the whole forming a plum-like fruit peculiar in the deep folds of the albumen of the seed which resembles that of the Nutmeg. There are now four species known confined to western Florida, California, Japan and northern China, although during the Tertiary period the genus inhabited the Arctic Circle and then spreading southward existed for a long time in Europe, from which it has now entirely disappeared. All the existing species produce handsome close-grained pale yellow durable wood, well adapted for cabinet-making, for which it is used in Japan in considerable quantities.

None of the species of *Tumion* have taken particularly well to cultivation or shown themselves really desirable garden plants. The Florida *Tumion taxifolium*, which is the type of the genus, is one of the least widely distributed North American trees, being confined to a narrow strip of bluff about forty miles in length along the eastern bank of the Apalachicola River from River Junction to Bristol. This tree can be kept alive in eastern Massachusetts in sheltered, well-shaded positions, and occasionally individuals have survived a number of years in gardens near New York and Philadelphia.

The California species, *Tumion Californicum*, which is really a noble tree, occasionally one hundred feet high, with a trunk four feet in diameter, is not at all hardy in the east, although it is occasionally cultivated in Europe, where it was introduced in 1851 and has produced flowers, although it gives slight promise of acquiring in Old World gardens the beauty which distinguishes it in the forests of northern California.

Tumion nuciferum, the Japanese *Kaya*, is common in the forests of central and southern Hondo and in those of the southern islands as an undershrub or small tree twenty

or thirty feet tall, and rises occasionally to the height of eighty feet, with a trunk four or five feet in diameter, forming a tree unequaled in the massiveness of its appearance and the beauty of its bright reddish bark and dark green, almost black, foliage. Although introduced into Europe more than fifty years ago, the Japanese *Tumion*, like the other species, has never really flourished in gardens for the reason, perhaps, as has been suggested, that most of the cultivated plants have been raised from cuttings, the seeds of *Tumion* being exceedingly difficult to transport without the loss of vitality as they soon become rancid. The nature of the climate where it grows, however, in central Japan, and the hardness here of its associates in its native forests give some hope that it may be possible to cultivate successfully this beautiful tree in the eastern states. The kernels of the seeds have a pleasant, resinous flavor, and in Japan are largely used as food; an oil, *kaya-no-abura*, used in cookery, is pressed from them and is an article of some commercial importance.

Very little is known of the Chinese *Tumion grande*, which has not been tried, probably, in our gardens, and which, possibly, will be found identical with the Japanese tree.

Taxus, the Yew, is a genus rather widely distributed through the northern hemisphere, with a small number of species all very similar in habit and foliage and nearly identical in flowers and fruit; it is characterized by short linear, alternate, sharp-pointed, dark green leaves disposed in a subspiral and appearing two-ranked on lateral branchlets by the twisting of the short compressed petioles, diœcious or monœcious solitary axillary flowers, the male with from four to eight stamens collected into a globular turbinate head, the female with an erect ovule on a ring-like disk, which enlarging becomes a bright red succulent aril, and nearly encloses the ripe seed. Six species are now known; they are widely distributed through eastern and western North America, Mexico, Europe, northern Africa, and western, central and eastern Asia, the descendants of Yew-trees which have existed since Miocene times.

The best known of all the Yew-trees, *Taxus baccata*, has been cultivated for centuries, and the oldest trees planted by man in Europe are probably Yews, which are believed to live occasionally for a thousand years. *Taxus baccata* is scattered over western and central Europe and the mountains of southern Europe and northern Africa; it reaches southern Scandinavia on the north, and extends through western Asia to the temperate Himalayas, where it is common, ascending to elevations of twelve thousand feet above the sea-level. In India the Yew attains its largest size, sometimes growing to the height of a hundred feet, with a trunk five or six feet in diameter. Usually, however, it is bushy in habit, and trees more than thirty or forty feet in height are not very common. Long before the Yew attracted much attention in modern Europe as a garden plant the wood was in great demand for the manufacture of bows, and for centuries after the Anglo-Saxon conquest Yew-wood bows were the principal weapons of the English. It is still considered the most valuable of the European woods for cabinet-making, and it is manufactured into many small articles of domestic use. In some parts of India the trees are venerated and their wood is burnt as incense, while both the bark and leaves are employed by the native physicians in the treatment of various human diseases.

During the seventeenth century, when the fashion for formal gardens and clipped trees prevailed in Europe, the Yew, which endures better than most trees an annual shortening of the branches, was cut into all sorts of fantastic shapes and was largely planted in hedges, for which purpose it was well suited and is still frequently used. The Yew has always been the favorite ornament for English churchyards, and no English park or garden is considered complete without it.

Taxus baccata must have been brought to eastern North America more than a century ago, as there are a number of large individuals in New York, Philadelphia and Balti-

more, for everywhere south of Cape Cod it appears to be perfectly hardy. Further east it suffers from the cold in severe winters, and cannot be considered a desirable tree for general planting in eastern New England, although it can be made to grow indifferently in well-protected situations.

There are found in gardens a number of interesting forms of this tree; of these the most distinct is the so-called Irish or Florence Court Yew, *Taxus baccata fastigiata*, distinguished by its upright branches which form a narrow compact pyramid somewhat broadened at the apex in old age, and large, spirally arranged, very dark green leaves. The plants of this variety are all female, and have been propagated from

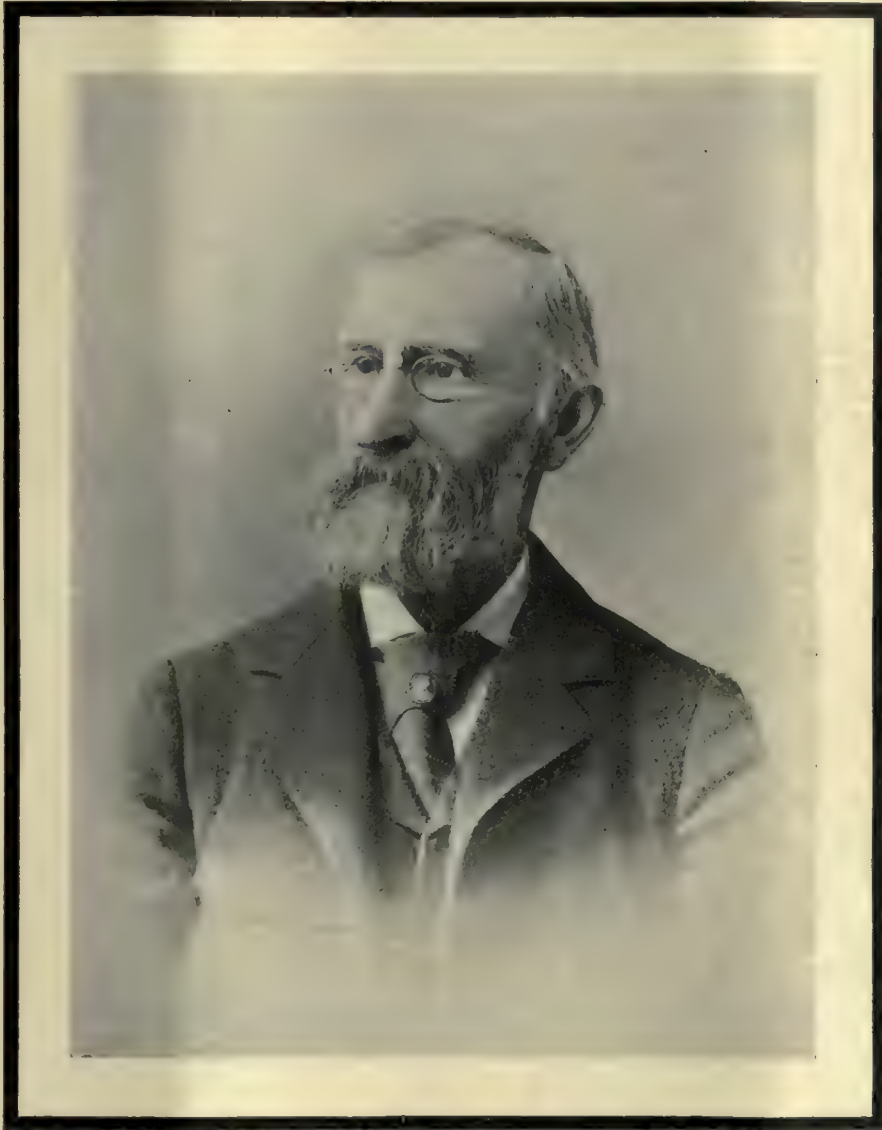
one or two individuals found during the last century on the mountains of County Fermanagh and planted in the garden at Florence Court, a seat of the Earl of Enniskillen. This upright-growing Yew, which is, perhaps, the most distinct and desirable of all fastigate evergreens, appears perfectly hardy about New York and southward, but does not support the climate of eastern New England, where, however, it is occasionally used as a tub-plant for the decoration of terraces and formal gardens. The Devoston Yew, distinct in its long, wide-spreading and somewhat pendulous branches and longer and darker leaves than those of the ordinary form, is a seedling variety which is now often cultivated in Europe and is occasionally met with in the gardens of the eastern states. Another form, *T. baccata adpressa*, with numerous

spreading branches and very short broad leaves, was long supposed to be a Japanese or Chinese plant. Only the female is known, and although now generally supposed to be a seminal variety of *Taxus baccata*, its origin is still doubtful. It is certainly rather hardier than other forms of *Taxus baccata*, and, although it grows here very slowly and remains shrubby, it can be made to live in eastern Massachusetts. Forms of *Taxus baccata* with yellow and with pale or silvery leaves are favorite plants in Europe, and they are occasionally cultivated in the United States; curiously enough, the golden-leaved Yew is much hardier in New England than any of the other forms of this tree with the exception of that last mentioned,

and with a little care it can be grown in sheltered positions in the neighborhood of Boston, although the tips of the branches are often browned during severe winters. Nurserymen have given names to many other seminal varieties of the European Yew, but none of these is particularly distinct or valuable, and none of them can be expected to thrive east of Cape Cod.

Of the North American Yews the very local *Taxus floridana*, which only grows with *Tumion taxifolium* on the banks of the Apalachicola, is practically unknown in gardens, although young plants were introduced two years ago into the Biltmore Arboretum; it is not probable that it would prove hardy at the north, or that it would be sufficiently

distinct as a garden plant to warrant any special culture or care. The Pacific coast Yew, which under favorable conditions becomes a tree eighty feet in height, with a trunk occasionally four feet in diameter, has not been fairly tested yet in the east. It grows not only on the coast as far north as Queen Charlotte Islands, but it spreads eastward to the western slopes of the northern Rocky Mountains in the United States and to the Selkirk Mountains in British Columbia, where the winter cold is much more severe than it is in New England. The snowfall, however, is greater, and small plants are protected all winter and until late in the spring by a deep covering of snow, while in summer the ground, shaded by the dense coniferous forest, never becomes very dry in the situations which this tree selects. The individuals which have failed in the



William A. Stiles.—See page 399.

east have been derived from the coast region, and better success might be obtained with plants from northern Montana, and an attempt to obtain a hardy race of this tree will be made in the Arnold Arboretum.

The third United States Yew, *Taxus canadensis*, is a low shrub, with nearly prostrate, wide-spreading branches, and is a common inhabitant of northern woods, often covering large areas of low moist soil in their dense shade, and is distributed from Newfoundland to Lake Winnipeg, and southward to Virginia and Iowa. This is, of course, a perfectly hardy plant, although it only thrives in moist, shaded soil, and it might be used more frequently than it is to cover the grounds in parks and gardens.

Taxus cuspidata inhabits Manchuria, Corea and the Island of Yezo, where it is widely scattered through the forests of deciduous-leaved trees, and where it often rises to the height of fifty feet with a tall, straight stem frequently two feet in diameter. In Japan this Yew is a favorite garden ornament, being one of the plants most generally cut into fanciful shapes, for like the other species it can bear the shears. It was introduced into the eastern United States in 1862 and has proved to be perfectly hardy as far north at least as Boston; it grows rapidly in cultivation and promises to become here a large, long-lived tree and a really important and valuable addition to the list of evergreens which can be successfully cultivated in the northern states. There is a dwarf compact form of this plant with short dark green leaves in cultivation in this country, which probably originated in Japanese gardens; often appearing under the name of *Taxus brevifolia*, it must not be confounded with the true *T. brevifolia* of the Pacific coast.

I have seen in California a Yew with fastigiate, somewhat spreading branches, which had been imported from Japan and which is evidently another garden form of *Taxus cuspidata*. This distinct plant, however, does not appear to have been tried in the eastern states.

All the Yews can be most quickly multiplied by cuttings which strike readily; they all prefer shade and moist deep soil, and they are all slow-growing and long-lived.

All the known plants of the Yew family which succeed or are likely to flourish in the north-eastern United States have now been mentioned, and it will be seen that in this important and widely distributed family only the Ginkgo, the Japanese Yew and the dwarf Yew of the northern states are really valuable and important garden plants in the north-eastern states.

C. S. S.

Magnolia glauca.

"The most part of their underwood are Bayes and such like."—*Hakluyt's Voyages*, vol. ii.

THE Swamp Magnolia, *M. glauca*, with its long coastal range and numerous inland stations between Gloucester, Massachusetts, and southern Florida, varies from a deciduous shrub at its most northern limit to an evergreen tree in the extreme south. Its most common form is that of a shrub from six to twenty feet high, and except for a straggly habit resulting from rapidity of growth, it possesses almost all the points necessary for a perfect plant, having extreme beauty of foliage and flower and delicious fragrance.

The young plants generally develop several shoots that remain almost vertical until the plant is well above the surrounding jungle, when the branches and also the leaves spread laterally. The growth is very rapid, ranging in one season from six inches to five feet, and the flowering branches develop normally three growing points, of which one usually far outgrows the others.

The thick leaves, from three to six inches long, with their shining upper surface reflecting the light and the silver sheen of their lower surface, are the most beautiful to be found among our native plants, for their beauty is of texture and is quite independent of weather, though there are times and seasons when they are unusually striking. These contrasted surfaces attracted the eyes of all the early explorers. The extreme rapidity of growth is understood when we consider the large area of leaf surface and examine the tissues. The upper epidermis is very thick; there is a double and often a triple row of palisade cells, and the lower epidermal cells are extended into two-celled needle-pointed hairs as long as the leaf tissue is deep. Besides this mat of silky fur there is wax on the lower epidermis, so the leaves have immense assimilative and protective powers.

The flowers, the smallest of our native Magnolia-blossoms, are of an exquisite ivory-white from two to three inches in diameter; they are borne on short stalks with outspread foliage leaves that fall and flutter about the flowers,

so that, except for their perfume, one might easily pass a blossoming shrub without seeing any of the flowers. The small fruit-cones, about two inches long, have scarlet seeds pendulous from very short filaments.

The inland stations of the Swamp Magnolia have several times been noted in GARDEN AND FOREST (see vol. vii., page 398, vol. viii., page 79), and the most westerly station of which I know, a swamp in the South Mountain at the headwaters of the Conococheague, supplied the sprays photographed by Mr. George Keen, of Harrisburg, and reproduced on page 403 of this issue. The South Mountain Magnolias are now, owing to the invention of the bicycle, in danger of extinction; they may be invisible, but their fragrance betrays them, and the man who collected for me lamented the terrible breakage and waste. Like all true woodsmen, he possessed that knowledge of tree growth and gentleness of touch which enabled him to gather with the least damage to the plant.

The Magnolias of to-day are a mere survival, a remnant, of that once widespread family that, so far as we know, first appeared in America in the Upper Cretaceous. In Tertiary times it was found in central Europe, Greenland, Arctic and mid-continental America, and then was cut off in the Ice Age, everywhere except in south-eastern Asia and south-eastern America. In historic time the written records of Magnolia begin with that first voyage to Virginia in 1584, where on the islands of Pamlico Sound its beauty and fragrance were noted by those keen-eyed old sea-dogs, whose conciseness of description is unequalled. A century later that careful observer and judicious collector, the Rev. John Bannister, took plants of *M. glauca* from Virginia to England, where they were planted in the Episcopal garden at Fulham, by Henry Compton, Bishop of London. Here the Magnolia found an old swamp friend in the fine large tree of Red Maple, taken over some thirty years earlier. About this time the Rev. Cotton Mather, also busy with observations and collections of a less pacific nature, as he was journeying from Salem to Gloucester, paused in his pursuit of witches in order to discover the source of an unknown fragrance, and made known that farthest north colony of *M. glauca* that has since given its name to the town of Magnolia. Exportations of Magnolia to England were continued early in the eighteenth century, for Collinson in 1735 wrote to Bartram "not to send any more cones of your swamp Laurel," but the demand must have increased, for two years later he wrote for more cones, saying "it is a fine plant, and when the wind turns up the silken side of its leaves it has a pretty effect." It is figured and described in Catesby's *Hortus Britanno-Americanus* as *Magnolia lauri-folia* (edition of 1763) and mentioned as one of the American plants with which "England should be enriched." The present specific name, *glauca*, was given by Linnæus, but the older name clung for some time. When Kalm visited Pennsylvania in the middle of the last century the common name was Beaver Tree, owing to the fondness of those animals for the succulent roots.

This native shrub with its long historic record, and growing in at least twelve of the Atlantic states, like all other Magnolias, is popularly supposed to be tropical, though by some curious mental perversion its name is also supposed to be of Indian origin. When we take the ordinary roadsides of the middle states to-day, and see the unsavory weeds growing by the million, there cannot too soon be strenuous efforts made to replace our Jimson and Pig weeds with those older and native growths of Rose and Viburnum, and cover seared brooksides with Rose-Bay and Magnolia, for one marked feature of all the old chroniclers is the unanimity with which they dwell upon the "sweetnesse and goodnesse of our native plants."

Harrisburg, Penn.

M. L. Dock.

The Shad-bush is leafing again by the sunny swamp side. It is like a youthful or poetic thought in old age. I would not fear the winter more than the Shad-bush, which puts forth fresh and tender leaves on its approach.—*Thoreau*.



Fig. 52.—Sprays of *Magnolia glauca*.—See page 402.

Foreign Correspondence.

London Letter.

POLYGONUM LANIGERUM.—A large round bed filled with this plant is a conspicuous attraction on a lawn at Kew. It has a stout main stem one and a half inches in diameter, with from six to a dozen lateral stems springing from near the base, and the strongest stems are six feet high. Planted in mass it forms a shapely group covered with foliage down to the ground. The leaves are a foot long, petiolate, with a lanceolate blade from three to four inches wide, wavy and elegantly curved; the whole of the leaf is covered with a gray, almost silvery down, to which the plant owes its chief attraction. It is easily raised from seeds, which should be sown in February, and the seedlings may be planted in the open air in June. It is a native of Natal, and for its introduction we are indebted to Dammann & Co., of Naples, in whose catalogue for 1890 it was first offered. It is also figured in the *Gartenflora* in 1890, page 224, fig. 52, where it is described as a herbaceous perennial from six to ten feet high, with flowers in clustered spikes and of a carnation-red color. It is not hardy at Kew.

VERBASCUM DELPHICUM.—Of the numerous Mulleins which deserve a place in the garden on account of their large handsome rosettes of leaves, this is one of the handsomest and at the same time one of the least known. It is a native of Greece, whence it has been introduced to Kew, where it is cultivated in a border in the open. The leaves, which form a bold rosette a yard or more in diameter, are broadly obovate, a foot and a half long and a foot in width, and are of a thick flannel-like appearance, gray-green in color, almost silvery white when young. The flowers are borne on a tall, branched, erect spike, and are yellow in color, as are those of most of the species of *Verbascum*. It should be raised from seed sown in spring.

SATUREIA MONTANA.—This plant is usually consigned to the kitchen garden, where it is grown among the sweet herbs for seasoning in cookery, and is known as Winter Savory, the whole plant being highly aromatic. It is also worthy of a place in the herbaceous border, or even in the rock garden, as it forms a compact, hardy, suffrutescent evergreen two feet or so high, which in the autumn is covered with bright lilac-purple flowers. It has a prominent place among the rock plants at Kew, where for some time it has attracted general attention. It is a native of the south of France and other parts of Europe, and has been cultivated as a kitchen herb for more than 300 years. It is recommended to be grown near beehives, its fragrant honey being much appreciated. The Summer Savory, *Satureia hortensis*, is a hardy annual with similar properties, but it is not nearly so decorative as *S. montana*.

BUDDLEIA VARIABILIS.—This is a Chinese species of recent introduction, and from what I have seen of it a promising shrub for the garden. In the nursery of the Jardin des Plantes, Paris, I saw fine examples of it eight feet high and covered with attractive flowers in August this year. It has also flowered against a wall at Kew, and a figure of it will shortly appear in *The Botanical Magazine*. It was described by Hemsley from specimens collected in Ichang, etc., by Dr. Henry, and I believe it was introduced into cultivation by way of the French gardens. It forms a large freely branched shrub with quadrangular branchlets, lanceolate toothed dark green leaves three to twelve inches long, and dense, erect, cymose panicles of bright rosy purple flowers, the individual flowers being small, with a tube half an inch long and a limb quarter of an inch across. It appears to be quite hardy, and the flowering season for it is probably of some weeks' duration.

CACTUS DAHLIAS.—An exhibition of Dahlias was a special feature of the last meeting of the Royal Horticultural Society. Sixteen new varieties were awarded certificates, and of these eleven were of the Cactus section. There can be no doubt that for cut-flower purposes the Cactus varieties are preferable to the others, and if they could be made to show their flowers well above the foliage when on the

plant they would be equally superior for garden effect. At present they are not seen to advantage, owing to the excessive leaf-growth above the flowers. It was noteworthy that the single-flowered section, so popular a year or two ago, was scarcely represented. In their attempts to breed out the defect in the Cactus Dahlias above referred to growers are losing the quill-like character of the florets which is the most pleasing peculiarity of the pure Cactus sorts. Some of the new varieties which owe their origin to crossing the Cactus and Show sections are defective for this reason. I made a list of the pure Cactus sorts which I thought first-class, both in form and color; they are as follows: Miss A. Jones, crimson; Starfish, crimson; Gloriosa, bright scarlet, by far the most effective Dahlia exhibited, the color being of the most glowing hue and the form large and elegant, the falcate form of the florets being most pronounced; C. Woodbridge, deep maroon; Lady Penzance, sulphur yellow; Mrs. C. Turner, bright amber yellow; Fusilier, terra cotta; Beatrice, bright magenta; Delicata, flesh pink, yellow centre; Keyne's White, the purest white yet raised. With the exception of the last-named the above sorts were exhibited by Messrs. C. Turner & Sons, of Slough, who have held a high position among Dahlia growers and breeders for the past fifty years. I might add as a hint to growers of these plants that the removal of all the top superfluous shoots from the plants strengthens the flowers and permits of there being seen.

EARLY CHRYSANTHEMUMS.—Exhibitions in September this year have been remarkable for the collections of flowers of Chrysanthemums shown. Breeders have been paying special attention to this point in recent years and as a consequence we have now numerous large-flowered varieties which bloom in September, that is to say, about two months earlier than the time formerly considered as the season for Chrysanthemums. At an exhibition held in the Aquarium on September 7th I noted a considerable number of Japanese sorts as well as pompons, and at the meeting of the Royal Horticultural Society, held on September 21st, several collections of Chrysanthemum blooms were shown. Some of these were so large and delicate that I suspected they had been forced, but I was assured they had been grown in the open air and had never been under glass. Japanese varieties, measuring six or eight inches across and of the most delicate colors, are, it appears, now available for September effect. Here is a list of the best of those I have seen so far: W. R. Prince, yellow; Milano, maroon; Barbara Forbes, white; Mytchett, white; William Laycock, pale yellow; Mons. Hoste, blush white, with wide florets; Lady E. Smith, white, broad florets; Lady Kennaway, rosy lilac; Miss E. Silsbury, pure white, large and elegant; Lady Fitzwygram, pure white, recommended as an excellent border variety; Madame M. Masse, rose-pink. These are all Japanese varieties, remarkable for the large size of their flowers compared with the early-flowering varieties hitherto known, and they may be grown either in pots in the open air, to be brought into the conservatory when in flower, or planted out in the herbaceous border for outdoor effect in autumn. They are already attracting the attention of growers of cut flowers for market.

London.

W. Watson.

Cultural Department.

Chrysanthemums in the Garden.

MY note about autumn flowers in last week's issue of GARDEN AND FOREST does some injustice to Chrysanthemums, in the failure to mention these as the leading autumn-flowering plants. But the last decade has seen the practical disappearance of Chrysanthemums from the open as plants grown by amateurs, and it did not occur to me to note them among the hardy flowers. It is just ten years ago, at an exhibition in Union Square, that the first Chrysanthemums grown for the cut-flower trade were shown in this city, and since that time their cultivation for that purpose has set a pace which an amateur can scarcely follow. That occasion

is specially memorable to me, for I then first came in touch with my friend Mr. Stiles, whose quick sympathies were at once enlisted in an experiment I was making in growing Chrysanthemums in the open under temporary protection, with entire success. This experience was put on record, together with an illustration of the shelter, in *GARDEN AND FOREST*, vol. i., p. 522. It seems a fitting time to urge on amateurs a more extensive cultivation of these flowers outside, for they are much neglected now in our gardens. However much one may admire the cultural skill of the florists in plumping up massive flowers, these immense blooms leave much to be desired by one who has formed his ideals from campaigning with plants in the border. The florists' chrysanthemum seems to me to bear about the same relation to the naturally grown flower that the conventionally correct man bears to the virile natural being.

There is no more enjoyable garden sight than a mass of glorious Chrysanthemum-flowers swaying on long stems in the crisp October breezes, and in the border under the autumn skies they take on new beauties unknown to flowers on potted plants under glass. The culture and protection are of the simplest. A very light protection will ward off early frost, and by using somewhat heavy cloth, to be rolled up during the day, and a stove for slight warmth at night, the Thanksgiving table may easily be brightened with the rich colors of these out-of-door flowers.

Elizabeth, N. J.

J. N. Gerard.

Dahlia Notes.

THE Dahlia has been popular for at least a century, and with good reason, for certainly no other garden plant equals it in the profusion of its flowers, the variety of its forms and colors and the length of its time of blooming. At this time it seems to be entering upon a period of higher appreciation than it has yet enjoyed, not only in the two new classes, called Cactus and Decorative (ill-chosen terms), but in the older forms, even the oldest of all, the "show" varieties.

The single-flowered kinds, interest in which has been declining for a few years, are again growing in favor as new combinations of colors, greater delicacy and clearness of tints and fresh developments of form have appeared. Even the foliage of the Dahlia is now taking on an ornamental appearance, sometimes in color, as in the kinds whose young growth is of a purple shade, sometimes in manner of growth, varieties appearing from time to time whose foliage is almost as finely cut as that of a fern.

Another comparatively new point in single Dahlias is that some kinds have a disk which, instead of the yellow color which a few years ago was invariably present, is of a dark color before the expansion of the disk florets. In the varieties Mars and Sirius the disk is red before opening, while in the fine maroon variety, Robin Hood, the disk is also maroon. When the outer ring of the disk of this kind has unfolded its anthers we have a flower all maroon except a ring of bright golden-yellow, a highly-pleasing combination. There is also much variety in the manner of growth of Dahlias; the three varieties just named, as well as some others, instead of branching widely throw all of their flowers upward above the mass of foliage and present a vivid appearance. For some reason all the varieties which have this habit of growth have flowers of some shade of red; there are no pink, white or yellow kinds which carry their blooms in this way.

New "show" and "fancy" varieties continue to appear in the catalogues of the English raisers, and half a guinea continues to be the ordinary price the first year. The difference between these two classes is clear in definition and usually in the flowers themselves. All one-colored flowers and all "tipped" flowers where the tip is darker than the ground color are "show" kinds, while all striped flowers and all tipped ones in which the tip is lighter than the ground are "fancy" varieties. This seems plain enough, but Grand Sultan has a red tip on a yellow ground, yet is classed as a "fancy" because its petals are also striped. Mrs. Saunders is a "fancy," though oftentimes its tips, normally white on a yellow ground, are sometimes light red.

The distinction between these two classes, as far as it depends upon light and dark tips, will probably appear senseless to many, but if it were agreed to call all tipped flowers "fancies" countless disputes would arise at exhibitions, for many seemingly unicolored flowers have the base of the petals white, and a beaten exhibitor would often be tempted to question the verdict of the judges on the ground that his competitor had exhibited tipped flowers. Of course, flowers are as keenly enjoyed by growers who never exhibit as by those who

do; but it is also true that flower exhibitions are refining and educational, and that competition for prizes is a cause of improvement in the specimens exhibited.

The Cactus and Decorative classes are confounded by most dealers as well as by most cultivators. The Massachusetts Horticultural Society made an effort this year to give the prize offered for Cactus Dahlias to true Cactus kinds only. The effort was not fully successful, for the collection which received the first prize had only four Cactus Dahlias out of twelve, the others being of the Decorative class. The American Dahlia Society gave its prizes for Cactus kinds last year entirely to Decorative kinds. If this course continues the true Cactus kinds will be buried under a mass of the other class, some of which, it is true, are exceedingly beautiful, though many are not.

In England the National Dahlia Society has adopted a list of recognized Cactus kinds, to which additions can be made of such kinds as have been judged worthy by a special committee. It would be an excellent plan if the same course were adopted in this country. I should be in favor of adopting the English list and such additions as may be made to it from time to time, providing that American-raised seedlings should also be recognized if they had been certificated as such. When the Cactus class came into existence, in the beautiful representative, Dahlia Juarezii, it became popular, and English growers, in order to share in the profit to be had from them, called all Dahlias Cactus that were not fit for the other classes; the natural result is now seen. I believe that any person who should see that unequaled flower, Gloriosa, would realize the undesirability of including such kinds as Robert Maher, Cannel's Favorite and the like in the same class.

Canton, Mass.

W. E. Endicott.

Plants of Doubtful Hardiness.

A COLLECTION of plants in a well-ordered garden includes many exotics from temperate climates, whose constitution is not sufficiently hardy to withstand our rigorous winters. It is not always the degree of cold from which such plants suffer. The rarity of the atmosphere, especially in the United States, is such that the frequent alternations of freezing and thawing are most trying. The heavy snowfall in New England is favorable rather than otherwise, and the injurious effects of sharp changes of temperature are even more severely felt in localities farther south. As an illustration, *Anemone Japonica* suffers more in Virginia than it does at Rochester, New York.

The hardiness of a plant cannot always be inferred from the latitude in which it is native or from the fact that it comes from a district from which hardy plants come. There is no rule that all plants of a region are hardy or tender, as the case may be. Our gardens are full of foreign plants which have been introduced from countries where the climate is much milder than ours, and in many other respects different. The common European Box, *Buxus sempervirens*, is quite hardy about Boston, and it is not uncommon to see it used as an edging in old-fashioned gardens. Yet its congeners, the Yew and the Holly, are tender. A knowledge of the natural conditions under which particular plants grow is necessary to their successful cultivation, especially as to their hardiness. *Mahonia Aquifolium* is apt to burn and would be classed as tender, but it is not tender under proper conditions. With a fair amount of moisture and shade, it stands well enough. Seedlings of *Azalea Indica*, from the mountains of Japan, have been brought into the Arnold Arboretum. *Taxus cuspidata* and *T. adpressa*, from Japan, are both perfectly hardy when on their own roots, though doubtfully so when grafted upon the stock of the European *T. baccata*. Curiously, though, the variegated form of *T. baccata* is hardy where the green type perishes. We should be particular when importing these plants, especially standards, as they may be grafted on *T. baccata* stock. The same condition exists with many beautiful *Rhododendrons*, especially in those hybrids where the blood of *R. arboreum* prevails. In this connection it should be noted that all *Rhododendrons* grafted on the *R. Ponticum* stock are doubtfully hardy, and it is seldom that such as have the stock exposed will endure our winters. This is especially the trouble with imported standards.

For the cultivation of Hollies, evergreen *Euonymus* from Japan, *Aucubas*, *Pittosporums*, Yews of the *Taxus baccata* type, some *Cupressus*, *Osmanthus*, *Rhapiolepis Indica*, and all other half-hardy plants of a shrubby character, good cellar or pit room is necessary. A part of a barn cellar will answer, if this is properly set off so that the drainage and gas from manure will not reach the plants. This should be well lighted and thoroughly aired, and if there is a dry subsoil it must be

well watered a few days previous to planting. Two or three waterings during the winter should be sufficient, but extra care must be taken toward spring, when the roots begin to move. If a large number of plants are grown and additional space is required, partly sunken brick or stone pits may be used. These are preferably built on the north side of greenhouses as lean-to structures, or may be made as additions to the barn-cellar. If the roof is flat and there is danger that the skylights will be overweighted with snow, tilted lantern skylights may be built, and this will also provide a good means of ventilation.

Wellesley, Mass.

T. D. Hatfield.

A Thin-skinned Americana Plum.

THE thick, tough and often harsh skin of the native plums is the most serious objection to their edible qualities, especially of those belonging to the Americana species. I have been looking hopefully for a variation in this species that should have the thin and mild skin of the Domestica plums, and now this variation seems to have appeared. A plum has recently been found in northern Minnesota that, with other valuable qualities, has a skin so thin and tender that it can be eaten, when fully ripe, as readily and with as little unpleasantness as the tenderest-skinned European plum. The fruit is very large for a native plum; it ripens early, and while not as rich as some of the finest Americana varieties, is sufficiently tender, juicy and pleasant to rank as first-class.

This plum, which is being introduced by a Minnesota nursery firm under the name Aitkin, appears to belong to the group that was described as *Prunus nigra* by Aiton, and that Professor Waugh proposes to designate as *Prunus Americana*, variety *nigra*.

Experiment Station, Madison, Wis.

E. S. Goff.

Vegetable-garden Notes.

THE vegetable garden presents a somewhat desolate appearance since recent frosts killed all tender vegetables, and comparatively few green crops now remain. We always have all crops removed to the rubbish pile as soon as they are spent, for neatness, and because they are disagreeable to handle if allowed to remain until after sharper frosts. The season now drawing to a close has not been a favorable one for all vegetable crops. There was an abundance of rain, but the temperature in June, July and part of August was much below the normal. There is only about one-third of an average crop of potatoes. Sweet Corn was not up to the average, being poor until the end of August. A great deal of Fodder Corn, grown by farmers in this locality, failed to ripen. A sowing of first-crop Sugar Corn made on July 18th gave us good ears by September 27th; Crosby, sown on July 2d, was ready a week earlier. Tomatoes have not done as well as usual; on light lands the season has suited them fairly well, but in stiff, clayey loam, such as our soil is, the results have been less satisfactory. For an early variety and good cropper, Early Fordhook (Burpee's) has done well; the fruits cracked less than those of any other sort grown by us. Aristocrat, Stone, May's Favorite, Honor Bright and Autocrat all proved reliable main-crop varieties. The past season suited Peas better, perhaps, than any other vegetable, and late sowings of American Wonder and Nott's Excelsior have recently given us nice pickings.

Celery now commands attention, as it is the most important crop remaining in the ground. This season we have been fortunate enough to escape all blight on our plants, although many market-growers complain of the prevalence of rust and leaf blight. As the season advances plants which are being blanched by means of boards will need some protection overhead in the form of a scattering of leaves, hay or dry fern. Winter varieties, such as Boston Market and Kalamazoo, must now be earthed up. Preparatory to this work we mix some air-slacked lime in with the soil about the stems of the plants to keep worms away. Of course, there are various ways of wintering Celery, all of which have something to be said in their favor. We have tried them all and are convinced that the best way to have Celery in good condition throughout the winter, with a sweet nutty flavor, is to avoid storing it in caves, pits and cellars, and to earth it up where it grows and protect it overhead sufficiently to exclude frost, with leaves or seaweed and boards. This plan may involve a little more labor, and market-growers may never adopt it, but for private establishments we believe it to be the best method. Winter Celery should be planted on ground where water never stands; we place ours on light soil and it never fails to winter well.

Root crops, such as Parsnips, Beets, Carrots and Turnips, are stored in sand in an open shed and covered with leaves on

the approach of cold weather. Parsnips should be left where they grow, or, at least, a part of the crop. Their flavor is improved by a few freezings. Those taken out in spring have a better flavor than the stored ones. Parsley may now be planted in a frame; the roots should be shortened and most of the large leaves removed. A few pots in a corner of a greenhouse will furnish a supply while frames are closed up by severe cold and snow. A few roots of Mint placed in boxes and brought into heat later on will also be useful. Lettuces from late sowings out-of-doors are now being transplanted into frames. Some of these will head up by Thanksgiving season, while others will continue the winter supply until they are succeeded by those sown in heat in the new year.

We have just made a sowing of forcing varieties of Tomatoes. These are intended to ripen from the end of February onward. Our earliest sowing now has fruits of a good size, and these will commence to ripen about the first of November. These plants need plenty of liquid-manure and the necessary attention in removing laterals, dead foliage, etc.

With the greater part of the vegetable garden cleared of crops, much may now be done to relieve the pressure of spring work. Beds of Horseradish, Asparagus and Rhubarb may be made now. Manure may be wheeled on vacant land and dug over as time allows, leaving it rough on the surface, so that frost may act on it. To make stiff, retentive soil more workable a dressing of lime rubble, finely screened coal-ashes, sand, road-scrapings or crushed shells may be given. We usually do some trenching in our vegetable garden before the first of December, and always work in plenty of good manure. Ground which has been cropped for half a century is greatly benefited by this treatment, as abundant crops in the succeeding season show.

Taunton, Mass.

W. N. Craig.

Plant Labels.

A SET of permanent labels which will suit the tastes of all cultivators of plants is not likely to be adopted, but there are several kinds now in use with which little fault can be found. For bearing the names of the larger-growing herbaceous plants and shrubs a strip of half-inch wood three inches long and two inches wide fastened to a bar of iron one-half inch wide, one-eighth inch thick, and of sufficient length to insure stability in the ground, seems to be an almost perfect label. Space is afforded on the surface for the natural order to which the plant belongs, though this is hardly necessary, excepting in public gardens, and for the common and technical names of the plant with its native country. This information can all be written in letters of sufficient size to be clearly legible at a distance of several yards. For the small-growing herbaceous plants and shrubs a good label is in common use in several of the large British botanic gardens. It was, I think, first brought into use by Robert Lindsay, of the Edinburgh Botanic Garden. This consists of a piece of sheet zinc about two and a half inches long, one and three-quarter inches wide, with the corners cut off. For keeping it in good condition a few inches above the surface of the ground a piece of galvanized wire about two feet long is bent double and the looped part is soldered on to the zinc. The prongs thus formed should be about two inches apart when in the ground. Windstorms and freezing and thawing of the soil have no effect in altering their position. The use of acid preparations for writing on the zinc has to a great extent been discarded. Besides their uncertain durability the appearance of the labels when written on with these preparations is decidedly unattractive. An improved method, first used, if I mistake not, by Henry Pfister, the head-gardener of the Executive Mansion, and successfully utilized in Europe since, is to first give the part of the label intended to be written on at least two coats of good white paint; these should be allowed to dry thoroughly. Before writing on this label it should be given a thin coat of black paint over the white, and while the paint is fresh the name should be written with a sharp-pointed stick. The black paint is thus displaced and the white shows through clearly. If the lettering is done properly it will last several seasons. When it becomes the worse for wear it is easily replaced by soaking the labels in a solution of lye to remove the old paint, when the operation of painting and lettering can be reproduced. The lettering is, of course, more legible when done with a camel's-hair brush in black on a white ground, or in white on a black ground. I prefer the latter method, as the entire label is less conspicuous. Labels for potted plants, especially Orchids and fine foliage plants, when made of strips of wood painted white have a glaring look, which detracts from the appearance of the plants. The method already suggested of painting white first, then black, and lettering in white, can

be done successfully either on the ordinary wooden strips, or on strips of zinc made after the pattern of the wooden ones in common use. For large potted plants, especially in public collections, it is advisable to do away with the long strips of wood or zinc, and use instead pieces of zinc three inches long and of sufficient width to hold the names and habitat. These should be fastened to bent wires and fixed in the pots so that they may be read in a horizontal position. Many persons forego learning the name of a plant on account of the inconvenience of trying to read a perpendicular label, and in the case of perpendicular labels they are drawn out of the pot with the prospect of being placed in the wrong pot after they are examined.

Botanic Garden, Washington, D. C.

G. W. Oliver.

Correspondence.

The Germination of Conifer-seeds.

To the Editor of GARDEN AND FOREST:

Sir,—A great difference exists in the germination of conifer-seeds from different localities. I have never seen this fact stated in print and give my experience in the hope that others may do likewise. The seeds of all the conifers hardy in the east come up at the same time or nearly so. Norway Spruce, White Spruce, Scotch, Austrian and Mountain Pines, the Colorado conifers, *Picea pungens* and *P. Engelmanni*, Douglas Spruce, *Abies concolor*, and other common conifers can all be uncovered at one time. But few seedlings come up ten days after the first ones appear, while conifer-seeds from a warmer climate are very irregular in germinating. I raised a large quantity in California in 1889 and 1890. The kinds already named were sown in beds adjacent to the more tender kinds. *Pinus Jeffreyi*, *P. ponderosa* and *P. tuberculata* started from two to four weeks before the others came up. *Abies magnifica*, *A. grandis* and *A. amabilis* came very scatteringly; the first of these appeared in April and the last in September, and they required careful attention. The various *Cupressus* varied as much as the *Abies*. Douglas Spruce, *Abies concolor*, and *Pinus ponderosa*, from Colorado, came up much more regularly than the same species from seed collected in California, but the seedlings from California seed made much larger plants at the end of two years. Most of the seed from the Orient acted as those of our native and European species do, being very regular in germinating. The exceptions are *Picea Morinda* and *P. Ajanensis*, but as I had very little seed of the latter and that apparently two or more years old, I may be mistaken in this particular. The seeds of *Sciadopitys verticillata*, *Cedrus Deodara* and *C. Libani* are also irregular in time of germinating. *Cedrus Atlantica* may also be added to the list, but it comes up more evenly than the seeds of other Cedars. The seeds of our native White Pine are the most uneven in germinating of those of the hardy conifers; but although they sometimes come irregularly, this tree can hardly be classed with the species which are irregular in germinating. *Thuja gigantea* and *Libocedrus decurrens* are irregular.

Waukegan, Ill.

I. H. Douglas.

Fruit-growing in Northern New England.

To the Editor of GARDEN AND FOREST:

Sir,—Thirty years ago, excepting along the borders and on the islands of Lake Champlain, northern New England gave little promise of ever becoming a region for the successful growing of tree fruits on a commercial scale. The winters in the more elevated parts especially were then bitterly severe and long, as now, and the intervening season, though extremely pleasant and healthful, was found to be so short as to prevent many of the choicer fruits from maturing. The most careful and experienced labors to have fruits mature were not successful. A similar condition existed also with our Canadian neighbors, and in our western states, Minnesota and Iowa especially. A few experiments in growing seedlings from the most hardy known kinds were successful, as in the case of Mr. Peter M. Gideon, who in this way produced the Wealthy apple; and there was also some success in the search for wildlings, as in the case of Scott's Winter. But such efforts were too uncertain in their results to be satisfactory. This need of hardy fruits was so marked as to check the growth and prosperity of several states. Strenuous efforts were made about twenty years ago to induce Congress to lend its aid in this direction and some good varieties were thus obtained. The method of distribution through Congressmen was the sending out of scions among their agricultural con-

stituents. But as comparatively few farmers were acquainted with the simple arts of grafting and budding, the general result was not satisfactory. However, some sorts which have proved to be excellent, not only for the north but for the south, were obtained in this way; and these, as they became known (one of them was the very widely grown Yellow Transparent), excited a strong desire for farther study of the tree fruits of northern Europe.

This object was at length effected by private effort, through Professor J. S. Budd, of the Iowa Agricultural College, in association with Mr. Charles Gibb, a wealthy citizen of Montreal, Canada, who was naturally desirous of promoting the interests of his own country in this important work. The labors of these gentlemen were not limited to an investigation of the Apples of northern Germany and Russia; all the tree fruits of those regions were carefully studied through nearly the whole growing season. The results were of great value and importance to the whole range of our northern states, from the Atlantic to the Pacific. I frequently receive requests for scions from northern California, Idaho and Oregon; and already I am in receipt of correspondence showing that the Russian tree fruits are found to have decided value in the states of the Pacific slope.

As for my own experience, I have watched the growth of the trees with daily care, and from year to year I have been more and more impressed and convinced of the great importance of the Russian fruits for a very large portion of our country. I may say that in less than twenty years fruit-growing has become an important rural industry in north-eastern Vermont, and in Maine, and is sure to expand in activity from year to year. Our farmers are rather slow to yield to persuasion in the matter of novelties, but they cannot fail to notice on all sides the increasing numbers of bearing fruit-trees of species and varieties entirely unknown until now. When they see our local markets fully supplied with a class of fruits hitherto seen only in boxes from Boston and New York, it will not be long before the reading and thinking men among them will be taking a hand in such a manifestly pleasant and profitable industry.

Newport, Vt.

T. H. Hoskins.

Recent Publications.

Eighth Annual Report of the Missouri Botanical Garden.

The eighth report of the Missouri Botanical Garden is before us and contains a financial statement of the President of the Board of Trustees, Professor Trelease's report as the Director, and important scientific papers on the flora of the Azores. From the President's report it appears that the income of the property belonging to the Garden was \$123,962 in 1896, and that the expenditures for the Garden, including maintenance, purchase of plants and seeds, herbarium, library, scientific investigation, etc., including an expenditure of nearly \$5,000 on account of the destructive tornado which visited St. Louis during the summer of 1896, was \$40,108.72, nearly the whole of the remainder of the income having been expended in taxes and in the improvement of real estate belonging to the Garden.

From Professor Trelease's report it appears that at the end of 1895 an inventory of the plants cultivated showed 3,921 named species and varieties other than annuals, and that the number during 1896 had somewhat increased. During the year 10,793 specimens were purchased for the herbarium and 5,674 were received as donations or in exchange. To the library 219 volumes and 702 pamphlets were donated, and 571 volumes and 1,216 pamphlets were added by purchase.

Plans for extending the Garden are being prepared by the Messrs. Olmsted, of Brookline, Massachusetts, it being the purpose of the director to use about one hundred acres of meadow ground adjacent to the Garden for the purpose of displaying a plant synopsis, by which it is proposed to show by living plants, as far as it is practicable to do so, the natural groups of the vegetable kingdom. The practical and theoretical instruction for garden students, which has often been alluded to in these columns, has been continued; and the report shows that this flourishing institution continues to perform a valuable service for botany and horticulture, and that splendid use is being made of Mr. Shaw's noble bequest to his adopted city.

By far the largest part of the report is devoted to a paper

by J. Cardot on the Mosses of the Azores, with eleven plates, and to Professor Trelease's botanical observations on the same group of islands, the result of his visits to them in the summers of 1894 and 1896. Fifty-five plates accompany this paper, which, in addition to a general discussion of the Azorean flora and the agriculture and horticulture of the islands, contains a catalogue of all the indigenous plants known to inhabit them.

Notes.

A branch of the Yokohama firm of Suguki & Iida, dealers in Japanese plants, bulbs and seeds, has been opened in this city at No. 15 Broadway.

A bronze monument erected in honor of Malpighi, the distinguished Italian botanist of the seventeenth century and the author of the *Anatome Plantarum*, was unveiled at Crevacore, near Bologna, on the 8th of September last.

Fringed Gentians, from woodland borders in northern New Jersey, have been favorites for corsage bouquets during the past few weeks, and these flowers have been so plentiful that bunches containing from fifty to one hundred could be bought for \$1.00.

In the *Orchid Review* for September A. H. Sinee reports the successful results of applying fertilizing salts to Orchids, a number of plants of *Cattleya Trianae* having been experimented on for two years. Equal quantities of nitrate potash and nitrate ammonia were used at the rate of two and a half grains to one gallon of rain-water. Under this treatment the plants made a stronger growth, and produced a greater number of flowers, and these were brighter in color.

A figure of *Lycoris squamigera* in a recent number of the *Botanical Magazine* (l. 7547) reminds us that this noble pink-flowered Chinese *Amaryllis*, first figured in the third volume of this journal (page 176), grows in California with surprising luxuriance. It is freely used in Golden Gate Park, at San Francisco, where it grows without irrigation, increasing rapidly, and produces in September abundant flower-stems three or four feet high. It is more vigorous and beautiful, and apparently much more at home there than in the eastern states, where, however, it is perfectly hardy.

A few specimens of the new rose, Dean Hole, have been on exhibition in the show-window of W. H. Brower & Sons, on Broadway, within the past week. These partly-opened firm buds suggest flowers of large size when fully grown. The Dean Hole rose differs from the cream-tinted President Carnot, which pales under gaslight, in that its rich shell-pink petals are particularly beautiful in artificial light. For this reason it is likely to be in special demand for dinner decorations, and it is expected that the supply will be large enough this winter to provide some of the smaller flowers for this use. The stems are strong and the foliage is luxuriant and pleasing. This rose was first shown two years ago at the dinner given in honor of Dean Hole in this city.

The Department of Agriculture has recently published an important work on the fibres and fibrous substances of all countries, entitled *A Descriptive Catalogue of the Useful Fibre-plants of the World*. The author, Mr. Charles Richards Dodge, special agent in charge of fibre investigations in the department, asks that any information about fibre-plants known to have been employed either commercially or in what may be termed native uses, such as for rough textiles, cordage, fishing nets and lines, basketry, etc., that has been omitted from this work be reported to him. He would also be glad to hear of any native or aboriginal names by which fibre-plants are known in the countries where they grow, which he has not been able to give. He asks, too, for notes on any errors in nomenclature, and for all such information as may enable him to prepare a revised edition of this important work, which is the outcome of a vast amount of patient labor, scientific investigation and technical knowledge.

The horticultural department of the American Institute Fair in this city included many notable exhibits during last week. Stove and greenhouse plants were among the principal attractions. Messrs. Ellwanger & Barry, Rochester, New York, and C. C. Corby, Montclair, New Jersey, had highly creditable exhibits of grapes in large variety. A new quince of large size and regular form won a special prize for Luther Burbank, Santa Rosa, California. In a large collection of semi-tropical fruits was an immense cluster of dates from Riverside, California. Guavas, from Florida, were shown in

large numbers, and their peculiarly sweet fragrance proved almost oppressive even in a large hall. This is said to be the first time this delicate fruit has been successfully shipped and exhibited in the northern states. Pomegranates, from California, were also shown, and the fruits of *Zizyphus vulgaris*, Jujube, from Augusta, Georgia. A collection of 500 species of grasses made by Mr. J. E. Lager in Colombia, South America, was one of the most attractive and interesting features of the exhibition.

The first of this season's Albemarle Pippins, from Virginia, were offered here last week and sold mainly for export at from \$5.00 to \$8.00 a barrel. Owing to dry weather during the past month there is more second-grade fruit in this crop than was expected; this means smaller apples, lower prices, and, according to experience in other years, good keeping qualities. Selected Yellow Globe peaches and the white Stevens Rare-ripes, of choice quality, from the Hudson River district, sell at \$1.50 for a basket holding a peck of the fruit. Large Beurre Bosc pears, from New Jersey, sell for seventy-five cents a dozen. Among other pears of rich quality are Beurre D'Anjou, from California, which lack the rich color sometimes seen in the eastern-grown fruit. The first Easter Beurres, from California, have already arrived; these firm pears, which are at their best in early spring, are now mainly sold for export to the West Indies and Europe. Small muskmelons, from Colorado, the last of this season, cost \$2.50 a dozen. Other specialties in the fancy fruit-stores are handsomely colored mangoes, from Venezuela. These sell at seventy-five cents a dozen, a price warranted by the showy and really palatable specimens, which are altogether the best heretofore seen in this city. Cultivated cob-nuts, or English filberts, have been imported within the past week, from Kent, England. These fresh nuts are sold in their husks and fifty cents a pound is willingly paid by those who esteem their delicate meats. Chestnuts, from cultivated trees in New Jersey, sell for forty cents a quart. Eighteen of these immense nuts weigh a pound and two dozen fill a quart measure. Some of the largest weigh two ounces each.

The Spindle-tree, a familiar shrub in American gardens, was recently described in an interesting article in the *Kew Bulletin of Miscellaneous Information*, which first appeared in *St. James Gazette*. It was stated that the Spindle-tree, *Euonymus Europæus*, is a native European shrub or small tree possessing great ornamental merit, and is too often overlooked by landscape-gardeners. It is deciduous, but its broadly lanceolate leaves of a wavy irregular outline, with minutely serrated edges, turn, before they fall, to a deep rich crimson. The small pale green cross-like blossoms, which open in May, are inconspicuous, but the fruit, when ripe in October, has all the appearance of a flower of brilliant hues. The fruit, indeed, from its color and shape, is the most distinctive as well as most beautiful feature of the tree. Each berry is four-lobed and of a lively rose-pink. When quite ripe the lobes open, disclosing four large seeds covered with a deep orange-colored membrane, the seeds and the husk then presenting a curious but attractive contrast. The wood of the Spindle-tree is exceedingly tough, and the husks and stems of the berries partake of the same character, so that long after the leaves have fallen these remain to enliven the wintry landscape. Birds will not touch them, and with human beings they act as a strong emetic and purgative. The wood is so compact and tough that it is hard to break and almost impossible to splinter. In the days of domestic industries, when every notable maid minded her wheel, it was in request for the making of spindles; hence its common name, by which it is known in Germany and Italy. The wood is also used for making the pointed ends of ox-goads, whence is derived another name of Gatter-tree, or Prick-wood. Chaucer calls the berries gaitre-berries, and in the *Nennes Preestes Tale* recommends them against ague and the humors. In Ireland it is called Peg-wood, because shoemakers use it for pegs for shoes. In France it is also known by the name of Priest's-cap, from the resemblance of the berry in shape to a biretta. Though goads and spindles are gone out of fashion, the wood is still employed in the making of a variety of small wares, such as skewers, toothpicks and fine pins for cleaning watches, and artists are said to prefer the charcoal prepared from the branches to any other, partly from its excellent quality and partly because it is easily effaced. A variety of the common Spindle-tree, bearing berries with white instead of pink husks, is occasionally found; but, although the contrast between the white husks and the orange seeds is curious, the effect is less pleasing than that presented by the berries of the commoner sort.

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The Advertising Nuisance.

THE abuse of natural scenery for advertising purposes has long been one of the most abominable of public nuisances. It has now become so flagrant in its atrocities as to be intolerable. There is hardly any section of the country where it can be escaped. In city suburbs, along rural highways, parkways and nearly every line of railway in the land the landscape is marred by the advertising fiend. It is a serious question how this nuisance can be suppressed. Boulders, ledges, cliffs, fences and buildings are painted over with hideous letterings, and quiet meadows are defaced by gigantic signboards. Journeys, whose chief interest used to consist in the enjoyment of scenery from car windows, are converted into nightmare pilgrimages. Scenery in travel has thus lost a great part of its charm; the lover of natural beauty can only be secure in his enjoyment by selecting some spot, if he can, where such things do not intrude, and resolutely staying there.

There are laws on the statute books of several states prohibiting the use of natural scenery for advertising purposes. Where there chances to be local interest in the subject sufficient to see that these laws are enforced they serve their purpose to a limited extent. But, as a rule, there is nobody whose duty it is to enforce them. Protests are loud enough, and they indicate a widespread public sentiment against the nuisance; but there is seldom any one who will take the trouble to bring complaint against the offenders. In a few places rural improvement societies have taken the matter in hand, and conditions are bettered correspondingly; in others the local officials have been required by public sentiment to enforce the law, with gratifying results. The main trouble is, however, that the scope of these laws is not sufficiently broad to meet the extensions of the evil that mark the more recent methods of the landscape-advertiser. Nevertheless, encouraging indications of changes for the better are to be noted in certain enactments and in efforts to secure such legislation as will effectively deal with the trouble. Some of these are mentioned in the latest report of the Massachusetts Trustees of Public Reservations. The standing committee of the trustees has observed during the past year several marked signs of general

disgust at the doings of advertisers: "For example, the state of New York has passed an act granting powers to the Park Department of the city of New York which will enable them to control all advertising within 350 feet of any public park or parkway. The Boston Metropolitan Park Commission proposes to restrict its reservations by making the acceptance of a restriction forbidding advertising a condition precedent to the use of the park border-roads by adjacent land-owners. The Pennsylvania Railroad Company, by instituting cash prizes for the best-appearing properties along its lines, is competing with the advertisers with excellent results. The English society for checking the abuses of advertising is pressing a bill in Parliament, which, if enacted, will institute local option in this matter by empowering such communities as accept the provisions of the act to frame and enforce strict by-laws regulating the practice of public advertising."

It would be interesting to see how far the common law may protect the public in this matter. It is an axiom that moral right should be legal right as well. The law should embody the sentiment of the community in this respect, and it is probable that a powerful public sentiment would soon convert moral right into legal right. The modern extensions of the scope of the common law in relation to public nuisances indicate that the protection of the public in this regard is properly a function of that law. In equity no man has a moral right to use his property in any manner detrimental to public welfare. The law relating to public nuisances is based on this principle. Modern public sentiment now regards as public nuisances various actions which were once held to be well within the limit of individual rights, and the common law is interpreted accordingly. It has long been recognized that no person may be permitted to pollute the air and the water, for they are thus made detrimental to public health. Later the pollution of the ground was placed under the ban for the same reason. Later still it has been recognized that the nostrils and the ears of the community are entitled to protection in the same way. Foul smells and loud and discordant noises have therefore been adjudged public nuisances under the common law, and there is a goodly line of decisions to that effect.

Modern science demonstrates that the health is powerfully affected by the condition of the nervous system; all diseases are aggravated by undue drafts upon the nervous energy, or by abnormal excitement of the nerves. Health is protected by defending the ears against assaults that injure the nerves, and we have seen that the common law has been made to cover the general welfare in this regard. There only remains, therefore, one other great avenue of sense to be guarded. It seems clear that offenses against the vision may with equal justice be brought under the scope of the common law and thus be adjudged public nuisances. Irritations of the eye, caused by hideous objects, offend the senses in the same manner that hideous noises offend the ear and foul smells offend the nostrils. The nerves suffer in the one case as they do in the others, and public health is injured accordingly. The public has a vested right in the landscape, whether the land be a public or private possession, and no man should be permitted to transgress that right wantonly. A long line of precedents exists to indicate that there is no one sense which arbitrarily is not entitled to the protection enjoyed by the other senses.

In the case of offensive advertising in the neighborhood of a parkway, it is evident that such advertising is displayed to attract the attention of the people that frequent a public pleasure-ground. The action of the public in establishing a place for common recreation therefore gives opportunity for certain private individuals to make a profit at public expense and to the detriment of the public in its enjoyment of the recreative facilities thus created. Without the public pleasure-ground the adjacent lands would be worthless for advertising purposes. The public therefore has just cause to seek redress for the injury occasioned in diminishing the

value of its recreation-grounds for the purposes for which they were intended.

Railway corporations suffer in the same way. Many a railway has gone to very heavy expense in making known to the traveling public the scenic attractions of the country along its line. The railway has, perhaps, been built largely with the purpose of developing and making accessible these attractions. The fact that the public has been drawn to patronize such a route of travel gives value to the neighboring lands, and when such lands are used by the persons owning or hiring them in a way which is a detriment to the parties that give them value—both the railway company and the traveling public—the company is clearly injured in its property rights as well as the public in its common rights, and they therefore have just cause to seek redress for damages inflicted.

The case of a public road is similar. The facilities created by the public for its own convenience are what has given the value to abutting property. This being used for advertising purposes to the public harm, the public has cause to seek redress. The park authorities, the railway company, the authorities representing the public in its ownership of the highway; these, as well as any individuals, should be sustained in a case in equity against offensive advertising as a common nuisance.

In Massachusetts the public park laws authorize park commissions to take, by right of eminent domain, not only lands, but rights in lands. It is clearly within their jurisdiction, therefore, to take such easements in lands about public parks and parkways as will forbid their use for offensive advertising purposes. The damage sustained by land-owners in such takings could not be material, for whatever profit they might gain by putting their property to such use would be enormously offset by the damage inflicted upon public rights through such use. This should be an effective weapon, in addition to the restrictions already alluded to as imposed by the Boston Metropolitan Park Commission.

It has been suggested that persons offended by obnoxious advertising unite in boycotting the wares thus advertised. Unfortunately there is too large a part of the public indifferent to such considerations, and advertisers would hardly be induced to reform their ways for fear of the consequences. A concern, however, could not advertise itself to better advantage than by announcing in the public prints, "The advertisements of these goods are not used for defacing natural scenery!" It would constitute a badge of respectability.

Notes on Cultivated Conifers.—III.

THE first of the genera of Coniferæ (Tribe Cupressineæ) which we shall consider in these notes, *Juniperus*, is well characterized by its subulate or scale-like leaves, dioecious, axillary or terminal flowers, the staminate with numerous stamens arranged on a central axis, the pistillate of many scales, each bearing one or two erect ovules and becoming thick and succulent and forming a berry-like strobile at maturity. Of the three sections in which botanists have grouped the species of *Juniperus* only *Oxycedrus* and *Sabina* need interest us here, as the single species of *Caryocedrus*, *Juniperus drupacea*, distinguished by its capitate staminate flowers and united seeds, will not probably prove hardy in our region, although Mr. Hoopes states in his *Book of Evergreens* that it succeeds in the neighborhood of Philadelphia. It is a small bushy tree, rarely thirty feet in height and rather widely scattered from Greece to northern Syria on mountain slopes, between two thousand and five thousand feet above the sea-level, sometimes forming open forests or often mingled with Oaks and Pines. The blue, fleshy, succulent berries of this tree, which are often nearly an inch in diameter, are said to be edible. In the other sections of *Juniperus*, where we are to find garden plants for the north, there are about thirty-five species, widely and generally distributed through the sub-

arctic and temperate regions of the northern hemisphere, being, however, most abundant in countries of small rainfall. They are very common in the arid south-western part of the United States and in northern Mexico, and in the countries bordering the Mediterranean, the largest number of species being segregated in these two regions. Junipers are scattered also from the Arctic Circle to the Bermuda and West Indian Islands, the Atlantic Islands, east tropical Africa, the Himalayas, and over eastern Asia, although it is only in arid or comparatively arid regions that they are numerous enough to be really conspicuous features of vegetation.

Junipers produce durable fragrant wood much used for posts and in the manufacture of many small articles, and the bark of many of the species contains sufficient tannic acid to make it valuable as a tanning material. In the fruit there is an essential aromatic oil used since ancient times in medicine; to Juniper fruit gin owes its peculiar flavor, and from the young leaves and branches of an Old World species *savin* oil is distilled.

Of the section *Oxycedrus* with seven or eight species, distinguished by axillary flowers, and ternate linear acicular leaves joined only at the base and white-glaucous on the upper surface, the most generally known species, *Juniperus communis*, is more widely distributed than any other tree or shrub of the northern hemisphere and in many forms has been cultivated for centuries in northern gardens.

In America this plant is distributed from the Arctic Circle on the Atlantic coast to the hills of Pennsylvania, to northern Nebraska, along the Rocky Mountains to western Texas, New Mexico and northern Arizona, and from Alaska to northern California; in Europe it is common all over the northern and central parts of the continent, and occurs on the mountains of the Mediterranean basin; it is spread over northern, central and eastern Asia, extending southward to the north-eastern Himalayas and by the way of the Kurile Islands and Kamtchatka nearly completes the earth's circle.

In the north-eastern states *Juniperus communis* is a rather common inhabitant of stony hillsides, where it makes broad masses of stout stems three or four feet high, spreading near the base and then ascending; at high elevations in the western part of the continent and far northward the stems are still more prostrate, forming close mats, and the leaves are often short and broad (var. *Sibirica*); and it is only on the bold and broken summits of conglomerate sandstone and limestone hills in one district of southern Illinois that this Juniper attains the habit and size of a small tree, although in central Europe it is often tree-like in its habit of growth.

The common hillside form of *Juniperus communis* is useful in forming low masses of evergreen foliage, or, grown singly, it will soon make a handsome specimen, which in time will become several yards in diameter. It is, of course, perfectly hardy, and small plants can generally be found in old New England hill pastures and easily transplanted into the garden. A variety of this plant with bright yellow leaves and branches, which was first propagated and distributed a few years ago by the late Robert Douglas, of Waukegan, Illinois, is now frequently planted by the admirers of such abnormally colored plants.

Of the European forms of this species the most distinct is the Swedish Juniper (var. *Suecica*), a plant with erect branches forming a narrow, compact pyramidal head, and occasionally eighteen or twenty feet high. This is one of the few strictly pyramidal conifers which are really hardy in New England, and it can be safely used here in formal gardens or wherever it is desirable to produce the peculiar effects which can only be obtained with pyramidal plants. Another fastigiate form of the common Juniper, the so-called Irish Juniper (var. *Hibernica*), with rigid erect branches clothed with short deep green leaves, is a favorite European garden plant; but in this country it is not very hardy, even in the neighborhood of Philadelphia.

The Polish Juniper (var. *Cracovica*) is a robust and hardy plant with abundant foliage and pendulous terminal

branchlets. More distinct than this last is an erect form of general pyramidal outline with delicate drooping branches and narrow leaves, usually known in gardens as *Juniperus oblongo-pendula*. This handsome plant is perfectly hardy in the neighborhood of Boston; it grows, however, very slowly, and in a quarter of a century, even in good soil, will hardly attain a height of six feet. For covering rock-work or for other positions where it is desirable to use an evergreen only a few inches high, the northern and alpine form of the common Juniper (var. *Sibirica*), with its wide-spreading stems pressed close to the ground, is an excellent plant, retaining its habit in cultivation and soon extending itself over a large area.

The other European species of the section *Oxycedrus*, which are small and not very important plants, are not hardy here at the north, but the Japanese *Juniperus rigida* can be grown in our gardens. Of rather more open habit, it is of the *Juniperus communis* type, although the branches are more slender and the leaves narrower and more elongated. On the Island of Hondo, where, although widely distributed at low elevations, it grows only on sandy barrens or dry sterile gravels, it is occasionally arborescent and twenty feet tall, but much more frequently remains low, forming a wide-spreading bush. This is the Juniper which the Japanese most frequently cultivate and which is often seen of large size and venerable appearance in their temple gardens.

Another Japanese species which may be expected to thrive in our gardens, *Juniperus conferta*, is a seashore plant which covers exposed sand-dunes with its long, stout, prostrate branches, and is distinguished in the dark green of its stout elongated leaves and in the size of its fruits, which are much larger than those of other Junipers of this section. This species was discovered by Charles Wright, the botanist of the Wilkes' Expedition, on the shores of Hakodate Bay, opposite the city of that name, on the Island of Yezo, where we have seen it growing in great abundance. In 1892 it was found by Mr. Veitch near Honjo, on the west coast of Hondo. C. S. S.

The Corsican Pine at Home.

THE prospect held out to us of a visit to the Corsican Pine forests was a tempting one. We remembered a reply made by a *garde général* in Corsica to the directors of the exhibition of 1867: "Impossible to send you, as you ask, sections of the trunks of our tallest Laricios; our longest saws are shorter than the diameters of our great trees." Then there were the more recent impressions got from the accounts of travelers in Corsica, and eloquent descriptions, concluding with the inevitable advice to "make haste if we wished to see really ancient trees and forests in their natural state." An excursion to Corsica was planned in the spring of 1897, but for various reasons the original band was reduced to four. These found their way to Ajaccio under the guidance of a Corsican, by adoption if not by birth, Monsieur Doumet-Adanson, who was so suddenly stricken by death after our return to France. In Ajaccio we were cordially welcomed by the Conservator of Forests, who gave us some valuable information on the present condition of the Pine forests. Monsieur Mabaret also insisted upon planning out an itinerary for us, which enabled us to see the best examples of Laricio in the limited time allowed to us.

The majority of the Corsican Pine forests are very easily approached to-day, the department of Bridges and Highways having constructed some marvellous roads, but there are other forests situated in remote valleys which are still only to be reached by way of mule-paths and goat-tracks. In these the largest trees, even when decayed, are still left standing, as their removal cannot be economically effected; also isolated trees situated in the rockiest and least accessible places remain intact for the same reason. Our party, which included one person already advanced in age and in delicate health, was not equipped for journeying over

mule-paths and scaling goat-tracks; the finest forests within our reach were, therefore, those of Aitone, Valdoniello, Vezzano, Marmano and Bonifato, the first four being situated in the department of Corte, and the last in that of Calvi, and all intersected by good roads. Those which offer most readily to the eyes of the tourist the finest trees set in the most picturesque surroundings, are the forests of Valdoniello and Marmano. The vale of Asco is almost alone at the present day in being still able to show some ancient trees as yet untouched by the hand of the exploiter, but we were forced to abandon this part of our excursion, which, however, has a place in our plans for the future.

The finest specimens of *Pinus Laricio* we saw did not exceed 19 feet 6 inches in circumference. Trees of 14½ feet to 15½ feet in girth were frequent enough; some of these were more than 130 feet high, but the mean height of fine old trees is about 120 feet. In the forest of Marmano, near to the pass of Verde, the highest and also the best-shaped trees were to be found, the dimensions of these being 11½ feet to 14½ feet around, by 130 feet high. They grow in clumps by themselves or pretty thickly mixed with Beeches and a few Firs. The Laricio in Corsica is found on the slopes of mountains with a marked preference for a northern exposure. Commencing at about 2,950 feet, the limit of the Maritime Pine, it reaches an altitude of about 3,400 feet. At this point it becomes rare, not because it does not thrive at such an altitude, since fine specimens are also to be found at the extreme limit of the forests, but because these highlands are pasturage in summer for flocks of sheep and goats. Outside this high zone replanting from seed is very easy; the great danger to the young forest arises from the risk of fire during the hot, dry, summer months. In the older parts of the forest the risk of destruction by fire is less, the trunks of the trees being stripped of their lower branches and the underwood being generally choked off by Pine. The groups of trees are as close and as regular as in our continental forests of *Picea* and *Silver Fir*. This is especially so in certain parts of the Aitone forest, which is one of the most regular as regards growth. But the full picturesqueness of *P. Laricio* is best seen in the higher limits of the forests. Here the growth is sparser, because the conditions of existence are harder, but chiefly because the majority of the plants have been cut down by the sheep and goats. In its struggles with wind and snow the tree is not so high; the trunk thickens and throws out some powerful branches, the leader is destroyed, and the crest becomes flat and spreading. Looking at certain Laricios in the vicinity of the pass of Saint Pierre, between the limits of the Aitone and Valdoniello forests, it is difficult not to believe that they are Atlas Cedars, as these grow on the highest of the Algerian mountains.—*Maurice L. de Vilmorin*. Translated in *The Garden from the Revue Horticole*.

Autumn Flowers in the Pines.

AUTUMN flowers are this year unusually abundant in the Pines owing to frequent rains during the summer. Some of the spring flowers are also blossoming now, and trees are flowering for the second time. *Magnolia glauca* has shown occasional buds and blossoms throughout the entire summer. Handsome flowers of *Rhexia Virginica* and *R. Mariana* are still seen among their pretty urn-shaped seed-pods, and *Ludwigia alternifolia* and *L. hirtella* also mingle their symmetrical yellow flowers with their winged seed-boxes. The long wand-like stems of *Decodon verticillata* are here, too, with their curious trimorphous arrangement of stamens and styles. The relative of this plant, *Lythrum Salicaria*, originally from Europe, but well established in this country, also has two sets of stamens, one longer than the other, and the style is long on some plants, while on others it is short. This is evidently one of Nature's provisions for cross fertilization.

While some plants seem purposely designed to have the pollen carried to different individuals, others, like the stem-

less Violets, are specially adapted for close fertilization. The showy Violets of spring scarcely produce any seed, but depend on the underground flowers of autumn, which do not open at all, but push up their well-filled seed-pods direct from the earth, ripening and scattering the seed thickly over the ground. From one plant of *Viola cucullata* many forms of leaf and flower are produced. A few years ago I took a thrifty plant of this Violet from its wild home and planted it in the garden. The flowers were intensely blue, and they disappeared without forming seeds, but later the cleistogamous seeds were produced in abundance and little plants grew all about the parent. Many of these seedlings are altogether unlike the mother plant. Some have deep-lobed palmate leaves, other plants have smaller light-colored flowers, and there are many variations in leaf and blossom from the one plain-leaved, deep blue-flowered parent. As an experiment one of the seedlings with strikingly deep-lobed palmate leaves was isolated, and similarly varied forms resulted from the autumn seeds. The other two species with cut and divided leaves, *V. pedata* and *V. pedatifida*, do not have this sporting tendency, but remain true to the parent form. The handsome small white Violets, *V. blanda* and *V. lanceolata*, have borne their delicate flowers this month, not as profusely as in spring, but the occasional shy blossoms are particularly welcome as late as this in the season.

Polygala lutea is still in flower, as is *P. sanguinea*. Among the Milkworts are also some species which have concealed subterranean flowers as *Polygala paucifolia* and *P. polygama*; the latter species is quite abundant in the Pines. In late summer it bears erect spikes of handsome rose-colored flowers, as well as the hidden fruitful ones. *Tephrosia virginiana* is delightfully fresh and luxuriant, and is now in bloom. The seeds of this plant and also those of the Wild Indigo, *Baptisia tinctoria*, have been almost wholly destroyed this season by a tiny weevil. The feathery white and flesh-colored spires of Meadow-sweet, *Spiræa salicifolia*, are still found in the damp Pines, and the flowers of many of the compositæ. Blue and purple Asters are abundant everywhere. The Golden-rods are past their prime, but good specimens of *Solidago sempervirens*, our most handsome species, are still found, with large thick shining leaves and fine heads with deep golden rays. *Coreopsis grandiflora*, after a rest of several weeks, has started afresh; its deep golden rays make it the most handsome of the genus, and it rivals *C. lanceolata*. Cone-flowers and Sunflowers are still here. The narrow-leaved *Helianthus angustifolius*, peculiar to our Pines, is full of bloom, and so is *Chrysopsis Mariana*. The flowers of Closed Gentian, *Gentiana Andrewsii*, as well as those of *G. angustifolia*, with large open corollas, are among our treasures in the damp Pines. But the glory of autumn is the ripening foliage of tree and shrub, which is now fast approaching its greatest splendor.

Vineland, N. J.

Mary Treat.

New or Little-known Plants.

Spiræa arbuscula.

THIS handsome *Spiræa* is an alpine shrub with erect, wiry, branching stems terminating in small compact corymbs of bright rose-red flowers. Its affinities are with *Spiræa lucida*, which is a larger plant with looser corymbs of white or pale rose-colored flowers, and which grows at a low elevation in dry woods from the Black Hills of South Dakota to southern Alberta and eastern Washington, with *Spiræa corymbosa* of the southern Alleghanies and with the Siberian and eastern Asiatic *Spiræa betulifolia*. It differs from *Spiræa lucida* in its dwarfer habit, in its smaller and much more compact flower-clusters, in its bright red stems covered with thin lustrous bark annually exfoliating in thin scales, and in its smaller ovate-elliptical or obovate coarsely crenulate leaves, which, like the young shoots, are slightly puberulous on the lower surface at least while young.

*Spiræa arbuscula** grows at Glacier, on the Selkirk Mountains, in British Columbia, and ranges southward along the Cascade Mountains and the high coast ranges of Washington and Oregon and along the Sierra Nevada of California to the centre of that range. On the Olympic Mountains in Washington it forms dense low mats at the timber-line at an elevation of 5,000 feet above the sea, while on Mount Ranier, on the opposite side of Puget Sound, it ascends 2,000 feet higher, enlivening in August rocky cliffs with its brilliant flowers.

This pretty and distinct plant (see illustration on page 413 of this issue) has been successfully introduced into the Arnold Arboretum, where it flowered freely last June, and promises to adapt itself to its new surroundings.

C. S. S.

Foreign Correspondence.

London Letter.

VANDA AMENA.—Although described and certificated by the Royal Horticultural Society as a new natural hybrid between *Vanda Roxburghii* and *V. cœrulea*, I am inclined to believe this is nothing more than a form of the first-named species with flowers a trifle larger and clearer in color than those of the type. It has exactly the leaves and habit of *V. Roxburghii* as represented at Kew. Whether hybrid or variety, however, it is a pleasing Orchid; the flowers, which are borne in racemes, are two inches across, the sepals and petals checkered with yellow and dusty ferruginous purple, the three-lobed lip, with panduriform mid-lobe, being violet-purple. *V. Roxburghii* is one of the commonest of Orchids in Bengal and other parts of India as well as in Ceylon, and it appears to be variable as to the size and color of the flowers. The ordinary form was figured by Lindley in his *Botanical Register*, t. 506, from a plant flowered in Sir Joseph Banks' garden at Spring Grove in 1819. It is said to prefer the Mango as a host-tree in Bengal. The plant under notice was shown by Messrs. Linden, of Brussels.

LÆLIA PUMILA, var. GATTON PARK.—Under this name a distinct and beautiful form of *Lælia pumila* received a first-class certificate last week. The type has rose-purple sepals and petals and a maroon-purple lip; the variety *Dayana* is darker in color with a white blotch on the lip, and that known as *præstans* has a trumpet-shaped lip with a yellow disc. There is also a form of the last *præstans* with ivory-white sepals and petals and another called *delicata* with nearly white segments. The new one differs from all these in having the sepals and petals of a pale blue shade, of that peculiar tint called French gray, while the color of the front portion of the labellum is rich blue-purple, with a patch of white in the centre. In the form of the labellum it resembles the variety *præstans*. This plant came from the collection of Mr. J. Coleman, Gatton Park, Reigate.

DENDROBIUM PHALÆNOPSIS.—While our Orchid-houses are now gay with the sprays of flowers of this lovely eastern Orchid it is satisfactory to see that the auctioneers are advertising sales of newly imported plump-bulbed plants of it by the thousand. It is emphatically a plant for every tropical collection. Any one who can grow *Nepenthes* or *Ixoras* or *Anthuriums* can manage *Dendrobium Phalænopsis*. Notable characteristics of this Orchid are the elegance of the sprays and the large number of flowers on each when the plants are strong, the variety of color and the delicate blending of the colors in the individual flowers. The close resemblance of the flowers to those of the beautiful Moth-Orchids, *Phalænopsis*, and the fact that these flowers remain fresh twice as long, all contributes to make it one of the very best Orchids in cultivation here.

APERA ARUNDINACEA.—A first-class certificate was awarded last week to a plant of this graceful Grass exhibited by

* *Spiræa arbuscula*, Greene, *Pittonia*, iii., 63 (1895).

Spiræa betulifolia, var. *rosea*, Gray, *Proc. Am. Acad.*, viii., 321 (not *Spiræa rosea*, Rafinesque) (1872).

Spiræa lucida, var. *rosea*, Greene, *Pittonia*, ii., 221 (1891).

Messrs. J. Veitch & Sons. The plant was in the form of a tuft of thin, rigid, erect culms about two feet high, clothed with narrow graceful foliage. It bore panicles of flowers

are so much longer than the culms that they trail on the ground unless the plant is elevated on a pedestal, in which position it is seen to advantage. This character may be



Fig. 53.—*Spiraea arbuscula*.—See page 412.

from two to three feet long which drooped in the most elegant fashion, forming an airy plumose or tail-like cluster, colored pale brown tinged with pink. The panicles

abnormal, for, according to the description and figure of *Apera arundinacea* in Hooker's *Flora of New Zealand*, the panicle is erect and about a foot long: "A tall, erect,

densely tufted, glabrous, most graceful grass. Culms reed-like two to five feet high. Panicle eight to sixteen inches long." It is a native of Northern Island, in New Zealand, and is also found in subtropical east Australia. The genus is closely related to *Stipa*.

MEGACARTON ORIENTALE.—A figure of this new garden plant is given in *The Gardeners' Chronicle* this week, where it is described as a remarkable Boraginaceous plant, closely allied to *Echium*, from which it differs chiefly in the smooth, ovoid, not tubercled carpels. It forms a tall coarsely hairy plant with large-spreading oblong-lanceolate basal leaves, and a central leafy flower-scape four feet high bearing numerous flowers in a loosely-branched pyramidal cyme, as in some of the species of *Echium* from the Canary Islands; for instance, *E. candicans*. The flowers are about an inch long and as wide, with a five-lobed limb, colored pink with purplish streaks. The genus is monotypic and is a native of Turkish Armenia. It has lately flowered in the garden of Mr. W. B. Boyd, Melrose, who obtained it six years ago, and it has been growing ever since in a rockery border in rather heavy loam. It is a stately plant for the herbaceous border.

CRASSULA COOPERI.—This dwarf species has small fleshy leaves which become tinged with purplish crimson under the influence of bright sunshine. In the autumn it flowers freely, and the bright rose-red of its cymes of tubular flowers are an additional attraction. It may be grown for carpet-bedding or for the rockery in the same way as *Sedum Acre*, *Mesembryanthemum cordatum* and *Alternanthera*, and requires the same treatment as these. It is a native of south Africa, and has been in cultivation about thirty years, but it has only lately attracted the notice of horticulturists. Messrs. G. Paul & Sons, Cheshunt, exhibited a basket of this plant at the last meeting of the Royal Horticultural Society, when it was favorably noticed. It is as easily multiplied as *Sedum Acre*.

ASCLEPIAS CURASSAVICA.—This plant is occasionally grown for its decorative character. It is also known as *False Ipecacuanha*, and is said to be used in the West Indies as an emetic. According to the following note, recently published in the *Kew Bulletin*, it has another and still greater value as an insectifuge: "Miss Manning would be greatly obliged if the Director would tell her what the enclosed plant is. It grows everywhere, as a weed, about the Isthmus of Tehuantepec (southern Mexico), and is used by the Indians there to keep away vermin, especially fleas. Miss Manning's friends in Mexico have tried it, and found it most successful. They make a rough broom of it and sweep the floors and walls of their huts, and find that they are not troubled with fleas for a considerable time afterward. They have tried brushing dogs with it when their coats are full of vermin, and it appears to answer the same purpose with them. The Indian name of the plant is *Chilpati*." The plant sent was unquestionably this *Asclepias*. Possibly it is known as an insectifuge to some of the readers of GARDEN AND FOREST.

EXHIBITION OF FRUIT.—The great annual exhibition of British-grown fruits arranged by the Royal Horticultural Society was again held this week at the Crystal Palace. Considering that the year has not been a good one for fruit, the display in every class was of surprising excellence. It is difficult for those who do not understand how such exhibitions are made and the special conditions under which, as a rule, the fruit shown is produced, to believe the reports from nearly all parts of the country of poor crops and inferior quality. The tables at the Crystal Palace literally groaned under the piles of superb apples, pears, grapes, peaches, plums, cherries, etc., shown as British produce. As *The Gardeners' Chronicle* remarks, it is a grand advertisement, and one that is needed to teach the populace what first-rate English-grown fruit is. Whether the populace would care to pay the price such fruit would have to realize to make it profitable is another question.

London.

W. Watson.

Cultural Department.

A Lily-bulb Disease.

IN a full account of the disease which last year attacked the bulbs of Lilies in Japan, Mr. G. Massee recently stated the following facts in the *Kew Bulletin*:

During the year 1896 a destructive wave of fungoid disease almost completely ruined the crop of Lily-bulbs grown in Japan for exportation to Europe. The first indication of this disease received at Kew was through a London dealer, who sent a large number of diseased bulbs for examination. These bulbs formed part of a consignment received from Japan in November last, consisting of 848 cases, containing 73,050 bulbs of *Lilium speciosum*, of the varieties *album* and *rubrum*. Out of this number only 250 bulbs arrived in a salable condition, the whole of the remainder being more or less rotten and worthless. At a later date the same firm received a second consignment of 37,590 very large bulbs of *Lilium auratum*, and of this quantity only 4,000 were salable. Similarly diseased bulbs, received from Japan, were afterward sent to Kew for examination from other sources. Finally, a quantity of bulbs obtained through an agent from Japan, for planting at Kew, contained a large percentage suffering from the same type of disease.

The bulbs received for investigation showed every stage of disease; in the earliest condition the base of the bulb is alone discolored and somewhat soft; this discoloration and softening of the tissues gradually spreads from the base, until finally, in the most advanced stage, every part of the bulb is of a brownish color, and sufficiently soft to admit of being readily crushed into a pulpy mass between the fingers.

Microscopic examination revealed the presence of slender, continuous, hyaline, branched hyphæ traversing the tissues in every direction; the cell-walls are never pierced, but gradually dissolved, and it is only at the last stage of the disease that the starch grains become irregularly corroded and gradually dissolved. So long as the epidermis of the bulb-scales remains intact there is no trace of mycelium or fructification on the surface, but when the tissue is reduced to a soft pulp, or when a diseased bulb is cut open, the broken surface is within twenty-four hours covered with a dense snow-white mycelium, which within three days becomes studded with numerous clusters of fruit, resembling to the naked eye miniature pins with round black heads. The occurrence of this particular form of fungus on every bulb examined suggested that it might possibly be in some way associated with the disease, and subsequent cultures and inoculations proved this surmise to be correct. The fungus grows readily as a saprophyte; the spores germinating and forming the characteristic superficial white floccose mycelium, which within a week bears an abundance of fruit, on such varied culture media as prune juice, sterilized potato, decoction of bulb scales, etc. In one experiment four spores were sown in a five per cent solution of cane sugar in water in a Petri dish, and at the end of six days the entire surface of the liquid was covered with the fungus in a fruiting condition. When spores were sown in a hanging-drop alone with a very thin section of Lily-bulb scale, it was observed that the germ-tubes could not enter the tissue through the epidermis, but that they entered readily at those points where the cells were not protected by the epidermis.

A set of experiments was also carried out, using healthy Lily-bulbs. Numerous experiments were made with other kinds of bulbs, and it was found that the fungus refused to grow on onions, however much mutilated. On the other hand, Daffodil-bulbs were very susceptible to the disease; if the roots were broken, or a wound made in the bulb, and afterward powdered with the spores, the disease showed itself within a few days, and was in due course followed by the characteristic fruit of the fungus. It was invariably found that, however much bulbs were mutilated, and then inoculated with fungus spores, submergence for a few minutes in a one per cent solution of salicylic acid or corrosive sublimate prevented the disease; in other words, all fungus spores coming in contact with the above-named solutions are destroyed, whereas the vitality of the bulbs thus treated is not at all affected.

Dr. Halsted has described a somewhat similar disease, called "soft-rot," as attacking the Sweet Potato in the United States. The fungus causing this disease, *Rhizopus nigricans*, Ehrh., is closely allied to the species under consideration causing the Lily-bulb disease.

In a summary Mr. Massee concludes that the Lily-bulb disease is caused by a parasitic fungus called *Rhizopus necans*;

the fungus cannot penetrate the unbroken tissues of the bulb, but gains an entrance through wounds, more especially broken roots; the amount of evidence forthcoming indicates that the bulbs are not diseased until after they are removed from the ground; the spores of *R. necans* are killed by a short immersion in a one per cent solution of corrosive sublimate or of salicylic acid. Neither of these substances have any injurious effect on living bulbs, provided they do not remain in the liquid for more than fifteen minutes.

The fungus is by no means confined to Lily-bulbs for its food; but, as experiments have proved, can live on a great variety of dead or decomposing substances; it may also occur as a parasite on other plants than Lilies in Japan, as it readily attacks and destroys Daffodil-bulbs. Judging from the enormous amount of injury caused, it would appear that the fields where the Lilies are grown must be saturated with the fungus, growing indiscriminately on various substances, and attacking the Lily-bulbs, along with other things, as a matter of course. If practicable, entirely new localities should be selected for the work. Even if this were done, great care would have to be exercised, so as not to introduce the fungus; the spores are readily conveyed from one locality to another in the soil on tools, cart-wheels, shoes, clothing, etc., in addition to being carried by wind or animals. An important point to remember is not to allow vegetable rubbish of any kind to accumulate, and all diseased bulbs should be burned and not allowed to remain on the ground, otherwise the zygospores that form on such old decaying bulbs would start the disease the following season. As little injury as possible should be done to the roots of the bulbs when they are removed from the ground, and the bulbs should be allowed to "sweat" before they are packed for exportation. If the fungus is known to be present when the bulbs are being prepared for packing, they might be placed in a solution of salicylic acid as advised. The sterilized earth in which the bulbs are packed appears very suitable for the work, and cannot be in any way considered as a cause of the disease.

Work of the Season.

SPRING-FLOWERING bulbs have all been received, and should mostly be at once planted. Long exposure to the air is injurious to all bulbs. Those intended for outdoor planting usually have to await the removal of tender bedding plants from the ground. In the preparation of the beds for bulbs it should be remembered that the soil has been more or less exhausted by summer bedding plants, and therefore deep digging and an application of thoroughly-rotted stable-manure are necessary. I have tried prepared fertilizers in Tulip-beds, but these have not proved better than stable-manure. The latter is really preferable in a stiff soil, and makes it more open and friable. The advantages of winter mulching for Tulips and Hyacinths have been questioned of late years, and in the latitude of Philadelphia it does not seem to be necessary if the bulbs are planted at the proper depth, so as to prevent their being heaved out by frost. Tulips intended to be forced for cutting can be handled most conveniently by the method used by florists; that is, by planting about fifty bulbs of one variety in a flat or shallow box, giving them a thorough watering and storing the boxes in a cold frame; here they are covered with earth to a depth of about four inches, and remain until needed for forcing.

For conservatory or house decoration several bulbs of Hyacinths or Tulips planted in an eight or ten inch pan are effective, and the same plan answers for Freesias, Daffodils and Lilies-of-the-valley. Flats of Lily-of-the-valley, for cut flowers, may be treated in much the same way as that noted for Tulips, except that the Lilies should not be covered to a greater depth than two inches. This is sufficient to prevent them from drying out, and allows the frost to penetrate readily to the pips. It is also much easier to remove the covering of earth from the boxes in frosty weather if a thin layer of long litter is shaken over the pips before covering them with earth, and there is less danger of snapping off the pips in the process of uncovering. The trimming of the roots of Lily-of-the-valley at the time of planting in either pots or boxes is another point observed by many successful growers. This permits the pips to absorb moisture more readily, and abundant water is necessary to the successful forcing of these plants.

In the forcing of Freesias and Roman Hyacinths, both admirable in the conservatory, root-growth is needed first, and, therefore, but little heat should be allowed these plants in the early stages of growth. The same rule applies to the ordinary Dutch Hyacinths.

Lilium longiflorum and *L. Harrisii*, which are now well started, should be brought in from the frame before hard frost comes. Moderation in watering is a good rule for these plants during the early part of the season especially. But little syringing is needed; the only insect likely to trouble them at this time is the green aphid, and this is readily disposed of with applications of tobacco-water or tobacco-dust. The large clumps of these Lilies, so much used in Easter decorations, usually comprise several plants started in small pots and afterward placed together in a large pot. This method permits the selection of plants that are all in the same condition of growth, and ensures a more even crop of flowers than would be possible if the bulbs were started together in a large pot.

Most of the *Caladiums* have finished their growth for this season and will be going to rest; while these shall not require much attention from this time on until spring, a watering as often as once a week or ten days will help to prevent dry rot if the pots are stored beneath a dry stage in the greenhouse.

Richardias and hybrid *Amaryllis* are also among the valued bulbs for winter and spring flowering, and having been properly rested may be started moderately now. *Amaryllis* enjoy a temperature of from sixty-five to seventy degrees; this is higher than is needed for *Richardias*, while both appreciate rich soil and abundant watering.

Holmesburg, Pa.

W. H. Taplin.

The Hardy Plant Border in October.

THE borders may still be kept bright with a good selection of hardy perennials. The best and showiest plant now bearing blue flowers is *Salvia azurea grandiflora*. This Sage grows luxuriantly in a warm sunny spot in light soil. A thick layer of dry leaves is sufficient protection here. *Sedum Sieboldii* is still flowering freely. Although this pleasing plant thrives on the front row of the herbaceous border, its choice of position is a dry sunny place in the rock garden; here its stems droop gracefully over the rocks, and its pinkish flowers, which are produced in much-branched umbellate cymes and last in good condition for several weeks, are seen to better advantage.

The neat perennial *Eupatorium coelestinum*, or Mist-flower, carries compact cymes of blue flowers at this time. The native *Dittany*, *Cunila Mariana*, is a neat much-branched plant with small purple flowers produced in corymbed cymes. It is attractive now in the front row of the herbaceous border, and is perfectly hardy here.

One of the neatest and showiest of the native *Asters* for use in the border is *A. turbinellus*. It is of easy cultivation and increases rapidly. Large plants may be placed about six yards apart in the back row of the herbaceous border, and their large bright blue flowers make a fine display at this time. Another distinct and showy species is *A. sericeus*. The slender stems of the plants, which are two feet in height, are thickly clothed with pubescent leaves of a silky white color. The flower-heads are large and the ray-flowers are of a deep violet color.

Solidago rigida is a good companion for these *Asters*, and takes kindly to cultivation. Another graceful and showy species of Golden-rod for the border in late autumn is *Solidago Drummondii*. This western species grows luxuriantly here; its drooping stems are from three to four feet long.

The white Japan *Anemone*, *Anemone japonica alba* or Honorable Jobert, is a handsome hardy perennial when in flower. The plants are unusually floriferous this season and have healthy foliage. They are grown in a slightly shady position and somewhat moist soil. A liberal top-dressing of well-rotted cow-manure was applied to them last autumn. The white flowers of this plant are among the best we have for cutting at this time.

Ceratostigma plumbaginoides, better known in gardens as *Plumbago Larpentæ*, is still producing an abundance of its violet flowers and helps to brighten the border. *Callirhoe involucrata* and *C. verticillata*, prostrate hardy perennials which belong to the Mallow family, have large violet-crimson flowers which are now plentiful. *Cedronella cana*, a labiate from New Mexico, of neat, erect habit, is now bearing its showy, purplish flowers. A few other desirable plants now flowering in the border are *Chrysopsis villosa*; the pink-blossomed *Eupatorium purpureum*; *Polygonum Virginianum*; the near relative of *Helianthus*, *Actinomeris squarrosa*, known also as *Coreopsis alternifolia*; the purple-flowered *Boltonia asteroides*; *Clematis Lavalleyi* and *C. Savatieri*; *Colchicums*, *Gaillardias*, *Potentilla recta*, *Geranium Wallichianum*, *Hieracium umbellatum*, *Aster Shortii*, *A. lævis*, *A. Novæ-Angliæ rubra* and *A. amethystinus*.

Harvard Botanic Garden.

Robert Cameron.

Correspondence.

Some Questions of Color.

To the Editor of GARDEN AND FOREST:

Sir,—A commentator upon Nature's beauty in a recently published book speaks of the "even yellow" which the Sugar Maple assumes in the autumn. And another writer, trying to decipher the mysteries of the coloring process, says that while every shade of the golden and ruddy hues is seen in the forest, each species of tree keeps to a tint of its own. Such careless generalizations are contradicted, of course, by the witness of any autumnal forest in eastern America, and in south-eastern New York an astonishing diversity is shown this autumn in the behavior of trees of the most prominent species.

Our forests were nourished by much rain in July, and afterward were not scorched by many burning days. Up to the time when they began to assume brighter tints their foliage, as a whole, was almost as full, as succulent, and as freshly green as in June; and now that cold nights and sunny days have alternated for a time, the untouched Maples, Oaks, and Sassafras-trees still keep their luxuriant June-like aspect, while their changed companions display their reds and yellows and browns in unusually magnificent masses; these often seem even thicker and more sumptuous than the green trees because variety in the coloring throws the richness of each branch, twig and tuft of leaves into strong relief.

This is preëminently a region of hills, range lying beyond range and shoulder rising above shoulder with only narrow strips of valley between. One must drive a good many miles up and down hill before coming out on high rolling districts whence the dim outlines of the Catskills are discerned in the far distance. And it is preëminently a region of forests. Only the more level stretches are cleared and farmed and dotted with houses and tiny villages where great Maple-trees show their most splendid hues. Elsewhere everything is woodland, broken only by a few meadows along the margin of the railroad, the little lakes and the streams, and a few partially cleared spots where hopeful or shiftless settlers or where summer residents have established themselves. It is all second-growth forest, of course. A few ancient giants reveal themselves here and there, but for the most part the lover of individual trees would find much fault with our woods. Nevertheless, the hills, when viewed as a whole, seem as beautifully clothed as they can have been by the aboriginal forest. Nowhere are there such signs of long-past burnings as we find in many parts of the Catskills or about Lake George, and nowhere such proofs of more recent devastation as are frequent in the Adirondacks. There are here no blackened stumps to declare the vandalism of man. As far as the eye can reach and the fancy can extend, the thick garment of the hills is torn only by massive outcropping ledges and precipices of rock. One may drive mile after mile, and except for the road upon which one travels and an occasional small-cleared space, the landscape appears as the Indians themselves beheld it. Yet this region is less than forty miles from New York, and only a few miles beyond begins the fertile and thickly-settled region of which the beautiful town of Goshen is the centre.

Few other regions so near a great city can show such broad effects of autumn colors, spreading out and reaching over range after range of hills. And the color is especially rich and varied here, for the admixture of evergreen trees is just sufficient to enhance that of the deciduous trees without making it spotty and confused. I have seen similar panoramas of wooded mountains in the Pennsylvania Alleghanies. But there the coniferous trees were so abundant that the effect so charming here was lost—an effect of infinitely varied yet always suave and delicately blended colors, rivaled in harmony among the works of man only by the coloring of old India shawls. There are no stiff and spiry Firs and Spruces in this region; only White Pines and Hemlocks, softer in outline and texture, and not a great many of these. The general tone of the hillsides is supplied by the yellows and browns of Oaks and Beeches, and it is accentuated in the most harmonious way by ruddier Oaks, more coppery Hickories, and Maples which show like balls of gold or tall feathers of scarlet.

Our Sugar Maples are aglow in every shade of brightest yellow, of flaming red, of clearest green and burning orange, mingling together, in the larger trees in the cleared spaces, with a brilliance exceeding that of anything else which Nature produces. The radiance of jewels is relative dullness in comparison if the sun is shining on the most gorgeous Maples in this season of brilliant coloring. And yet almost more beautiful, and, I think, less commonly seen, are certain Swamp Maples which are not yellow or red at all, but pink—pink of

that shade which, if a milliner's term may be borrowed, is called "old rose."

Almost this same color appears also in the Dogwoods, together with several other colors: a dusky purple, an almost orange-red, a dull dark crimson and a pale ashes-of-roses hue. The Ash is still another tree which assumes a wide range of color, and varies between a dusty plum-color and a pale yellow. Many of the Sassafras-trees are multitudinously variegated, almost every leaf streaked with red, green and yellow, as though each was anxious to show the three prominent colors which October has chosen for its heraldic shield. Again, if we group the various kinds of Oaks together, we get a gamut of tints which runs from the darkest maroon to yellows of a golden, a copper and a brazen quality.

Perhaps some day an observer scientific enough to explore the laws of plant-growth even more minutely than they have yet been explored, and patient enough to watch the same trees carefully year after year, may, in part at least, read the riddle of these seemingly lawless variations. One thing to be studied will be the question in how far any weakness in a tree or in any of its parts accelerates the coming and affects the character of the autumnal change. We have all seen the leaves on a branch half-broken from its trunk turn brilliantly while the rest of the tree remained green. But, on the other hand, one which appears as vigorous as its fellows may turn a bright gold or blush a vivid red and stand out as a great isolated bouquet from the verdant masses about it. Does this branch also in some way and to some degree lack vitality, as the half-broken one so evidently does?

Again, if leaves turn as they dry, or dry as they turn, why are the well-watered trees in swamps so apt to be the first to show bright colors? And the effects of light need also to be studied. Here, for instance, is an Ash-leaf picked up from the ground. Some of its leaflets had partially overlapped the others, glued to them, probably, by moisture. The exposed surfaces are a soft plum-color, while the surfaces which had been hidden are a clear yellow. On the other hand, Beech-leaves which had similarly clung together I have found to be of a bright yellow color where the light had struck them, and of their normal green where they had been concealed. Light seems to have played a controlling part in these diversities, as it sometimes seems to do when only the tips of Maple-boughs grow vivid. But, on the other hand, a White Oak beginning to turn will show deep red leaves, not gathered on a single branch or tipping isolated shoots, but sprinkled singly all over the tree, and as often near its trunk and on the under side of its branches as where the sunshine falls more fully.

Tuxedo Park, N. Y.

M. G. Van Rensselaer.

In Nature's Own Domains.

To the Editor of GARDEN AND FOREST:

Sir,—To travelers who reach the far frontier the richness of the native flora of the prairies and woodland is a surprise and pleasure. Wherever the sod is yet unturned, or the verdure unchecked by close grazing, it is like a rainbow-hued flower garden in which one may wander and gather at will and yet leave a world of bloom behind. Nor are the banks of the rivers or the shores of unfrequented ponds much behind the prairies and woodlands in the rare beauties displayed. The snow-white Water-lily floats on the still waters. A fringe of scarlet and blue and white sweeps the water's edge, where the bright-hued Cardinal-flower and Lobelia are established, while the sweet breath of the neighboring Clethra fills the air.

But on the unbroken prairie and the unfrequented woodlands are the chief surprises. Everywhere are plants and flowers unknown to us. There is a grace and charm about these wind-tossed flowers that by contrast make the ordinary flowers in trade appear ugly and stiff. Taken from their native haunts, with no longer the cloudless blue sky above them, and the loving comradeship of thousands of their own kind about them, where they no longer nod to the prairie breezes or peep through the vailing prairie grasses, the charm of many of the wildings vanishes. They are then poor and weedy, and consigned to quick oblivion by the gardener.

But the beauty of some of these denizens of the wild wood survives even in our hard, formal borders. The Liliun superbum, with its tall column of clustered nodding flowers, is rich and stately whether blowing at will on a western plain or planted in a park. Cultivated Orchids from far countries are not more beautiful than their American relative, Cypripedium spectabile. Their curiously twisted and inflated blooms, satiny white, with clouding and needle-like rays of softest pink-purple, are plentifully borne on plants transferred to a shaded hillside or water edge.

In the edge of the open woodland may be found the yellow Violet with tiny Pansy-like flowers of a hue unlike anything known in any cultivated Violets. A man of fastidious tastes once said but two flowers are golden without being hard or metallic, the yellow Rose and the wild Violet of the hedge-rows. Later, in the same woodland, the Fringed Gentian is found. Blushing Rue-Anemones, deep pink Sabbatias, Lily-like Erythroniums, dainty Ferns and Dicentras, blazing Fire-pinks and glowing Golden-rods come in cheery succession from springtide to autumn.

Pineville, Mo.

Lora S. La Mance.

A Winter Plantation.

To the Editor of GARDEN AND FOREST:

Sir,—I wish to make a small winter plantation but have not sufficient knowledge of shrubs and trees to compose a harmonious planting, and so ask for your suggestion. It is desired to make this planting on a lawn looking to the south and terminated on the street boundary by a retaining wall of rustic stone about five feet high. The space to be planted is on the end adjoining the wall and between the walk leading to the house entrance and a Maple fourteen feet from the walk, this tree being about eighteen inches in diameter. The Maple is conical in shape, the result probably of early pruning. The branches are high above the ground, so that the lawn under the tree receives considerable sunlight. The purpose is to make an agreeable winter plantation visible from the living room sixty-five feet distant from the street. There are other shrubs on the lawn.

The trees from which it is desired to make selections are Black Alder, Thorn, Cranberry-tree, common Barberry, Euonymus alata, Pyrus arbutifolia, Andromeda Mariana, Kerria, Ink-berry, Red-twigged Dogwood and Cotoneaster vulgaris.

White Plains, N. Y.

Robert A. Kutschbach.

[The list of shrubs suggested by our correspondent is, on the whole, a good one. For the purpose he indicates Berberis Thunbergii might be added to it, as it is one of the best winter-berried shrubs in cultivation. The most showy of our Thorns in winter is probably Crataegus Crus-Galli, although perhaps this tree would be too large for such a position. Euonymus alata, although very ornamental in the autumn when its leaves turn rose color, is not a particularly desirable winter plant, as the fruit is small and inconspicuous; and Andromeda Mariana, which produces beautiful flowers, has not showy fruit.—ED.]

Rusty Appearance of Elm Leaves.

To the Editor of GARDEN AND FOREST:

Sir,—I enclose some leaves of Ulmus Americana with the request that you will explain the rusty appearance of their under side, which I suppose is the work of some insect I have as yet been unable to detect. On my lawn and in my garden in this city are a number of seedlings of this species from three to five years old. These have flourished thus far, and some have made upward of three feet of new growth during the present season. They have had sufficient water, the entire trees having been sprayed quite frequently, but not to excess. About the first of August the leaves of nearly every one of the Elms began to show the rusty appearance of the enclosed leaves, and in some cases they have become dead, the rust showing through to the upper surface, and some have dropped off the tree. I have watched the trees closely and have been unable to detect any insects preying upon the leaves.

Some specimens were sent to Professor A. D. Hopkins, Entomologist of the West Virginia Agricultural Station, and his reply is as follows: "I have examined the leaves of Ulmus Americana enclosed in your letter to me, and while I fail to find insects of any kind, the character of the injury would indicate that it is due to the presence of a very minute mite, working on the under side of the leaves. If so the best remedy you can apply is to spray the trees with water, applying it very thoroughly and with as much force as possible. Of course, you cannot do much good now, but if you will begin next spring before the leaves are injured I think you will be able to prevent the recurrence of the trouble."

I myself fail to find any evidence of the existence of the Elm-tree beetle which has ravaged the Elm of the east. Professor Hopkins states further on in his letter that he does not ascribe the trouble to the Elm beetle. As I have said already, I have tried the remedy which he suggests, that is spraying the trees thoroughly with water, but without good effect.

The rust has apparently not affected or injured the growth of the trees, and they have made a rapid growth and appear perfectly healthy otherwise. Only a portion, perhaps one-third or one-half of the leaves, appears to be affected, and the remainder keep their fresh appearance. The leaves affected are almost invariably the older ones, but are on the new growth as well as the old. September has thus far been so warm that the trees are still growing. I note upward of two inches of new growth on some specimens since the first of September.

I am the more disappointed on account of this trouble because I have advocated the planting of Elms in the outskirts of this city, and have induced my neighbors to cultivate seedlings native to the immediate neighborhood. The soil on my lawn and garden is the regular prairie alluvium mixed slightly with coarse sand, overlaying a thick strata of yellow clay under which is the blue or tunnel clay of the region. The land was formerly cultivated, but when I took possession it had lain fallow for several years, being covered with natural prairie grass and weeds. Nothing has been done to it except to level it up with the same kind of soil, with almost no application of fertilizer. It seems to be rich enough for all kinds of vegetation, for flowers in great variety and vegetables have grown luxuriantly this season, as has the grass on the lawn proper, although but little watering has been done owing to the pressure in our water-mains. My place is eight miles from the business portion of the city and there are no gas-mains in the neighborhood, electricity or oil being used for lighting; and there are no factories near by. No external influences to cause leaf-blight are apparent. Seedlings of Fraxinus Pennsylvanica, Acer Negundo, Ulmus fulva, Fraxinus Americana, Acer barbatum, Tilia Americana, Alnus rugosa, Populus monilifera, Catalpa speciosa and others are all healthy and flourishing, and unaffected either by insects or disease, and all of these have made rapid growth since the first year, except Tilia Americana, which, though healthy, has grown very slowly.

I am much impressed with the fitness of Fraxinus Pennsylvanica for the soil and climate of this locality. Although not so rapid a grower as some of the other species named, it still makes satisfactory growth. Fifteen-year-old trees in this neighborhood have reached a height of thirty feet and a trunk diameter one foot from the ground of from six to seven inches. The great value of the species is its absolute freedom from all diseases and from the ravages of insects and vermin of all kinds. During a long residence in this section and careful study of the species (which is indigenous to this immediate neighborhood, and quite abundant along the headwaters of the north branch of the Chicago River and along the Des Plaines) I have never found the tree subject to disease or insects. The only objection to it is that it seldom grows to any great size, though fairly long-lived, and is therefore hardly suited for a street-tree where much shade is desired. It is, of course, also somewhat objectionable on account of the late development and early falling of its foliage. This tree flowers and fruits abundantly along the streets in this immediate neighborhood, and I have had excellent success in planting the seeds. I find that it bears a good deal of hard usage, though it is apparently grateful for care and cultivation. Some handsome trees of this species grow near by. The natural crown is conical, but there is no difficulty in producing a wide round head by judicious pruning.

Catalpa speciosa has been planted quite extensively in this neighborhood, and, although a native of the southern part of Illinois, it does not do well in this latitude. It flourishes for a few years, blooms luxuriantly in season, bears an abundance of fruit, but after a time sickens and dies, apparently decaying from the heart outward. The whole trunk often becomes a mere shell before the north-west gale rends it apart. It shoots quickly from the roots and makes a wonderful growth for the first two or three years, but, in my opinion, it is absolutely worthless in this section.

Alnus rugosa does well when only a small tree is desired, but it is often infested with vermin, and at times is greatly troubled with the same borer that attacks the Maple family.

If Ulmus Americana is not hereafter subject to blight and rust, as shown by the enclosed leaves, I am inclined to recommend it as the most desirable tree for planting in our streets, but I have noticed a great deal of this blight during all of this season in old as well as young trees.

Irving Park, Ill.

O. S. Whitmore.

The leaves of Ulmus Americana have been examined with a compound microscope, and I do not find any fungus doing the work that results in the discoloration of the leaf that Mr. Whitmore has naturally enough termed "rust."

At this time of the year Elms are showing the same condition quite generally with us. As a test I went out to a tree standing near the Experiment Station building, and the first branch examined showed leaves that closely matched those which came from Irving Park, Chicago.

When this discoloration occurs in October it may well be called the phenomenon of natural death, but the cause or combination of causes that led to it in the case under consideration I am not able to name. Professor Smith thinks that insects of various sorts often hasten this decline. Lack of sufficient moisture or food material may bring about similar results.

New Brunswick, N. J.

Byron D. Halsted.

Notes.

Friday, October 22d, has been set apart by the Superintendent of Public Instruction of Pennsylvania as Fall Arbor Day.

The manufacture of beet-sugar was begun in Rome, New York, October 6th, in the first factory operated east of the Mississippi River. The company expects to use about 20,000 tons of beets this season. Tests of beets grown in the vicinity showed from fifteen to seventeen per cent of sugar early in the season, and fully ripe beets will yield a larger percentage. Thirteen per cent is needed for profit.

Professor Cockerell writes us from Mesilla, New Mexico, that on September 22d of this year, Mr. Alexander Craw found some Bamboos, from Japan, which were about to be landed at San Francisco, to be badly infested by a small white scurf-like scale. This proved to be *Aspidiotus secretus*, originally described by Professor Cockerell last year from specimens taken by Mr. Takahashi in Japan. The same insect has been found by Mr. E. E. Green in Ceylon. Growers of Bamboos in this country should be on the lookout for it to prevent its getting a footing here.

In a paper read a week ago before the New York Gardeners' Society, Mr. John E. Lager gave an account of his recent experiences in collecting Orchids in South America. It was stated that Coffee plantations have taken the place of extensive forests where Orchids were formerly found. The Cattleya region has suffered most, as the elevation and temperature favorable to Cattleyas are also desirable for the Coffee-tree. The South American Andes is said to be the richest section in useful species in the world. The vagaries of Orchids as to habitat were touched upon, and the costliness of Orchids was explained in their comparative scarcity and the inconveniences attending their collection and transportation. Simplified methods of cultivation were described which have led to the more general growing of Orchids, and the sale of cut flowers was also credited with bringing these plants into popular favor.

A comprehensive and interesting account of the Establishment of Public Parks in the City of New York, read last April before the Historical Society of this city by Mr. Gherardi Davis, has recently been published under that title in a neat pamphlet intended for general distribution. After a brief statement of the necessity of public parks in cities and the desirability of guarding them against encroachments, the history of the park movement in New York City is given, beginning with the suggestion made in a letter published in the *New York Packet* in 1785 and addressed to the mayor and aldermen, in which it is stated that "there is not in this great city one proper spot where its inhabitants can enjoy with convenience the exercise that is necessary for health and amusement." The history of Bowling Green, the Battery, and the various squares and parks of the city is told from the time they were proposed until they were acquired by the city and developed as public pleasure-grounds. Facts and incidents are here brought together which are not found in any other publications with the exception of the fragmentary and disconnected records in park reports and occasional newspaper and magazine articles. Some park boards have not complete sets of reports in their own offices, and until recently no systematic effort was made to bring together sets of such reports in any of the important public libraries. Information on this subject cannot fail to be of value to persons interested in public parks, which have come to be an important factor in the development of American communities. The Park and Outdoor Art Association, of which Mr. Warren H. Manning, of Boston, is the secretary, is bringing together as complete sets of park reports and of other publications relating to outdoor art as it is possible to obtain. This particular pamphlet should be the forerunner of similar publications in other cities.

A Horticultural Department has this year been established in Berea College, at Berea, in south-eastern Kentucky, and in addition to class-room instruction there will be manual training in garden and nursery work. This introductory work will be followed by a more extensive course of study which will include the botany of cultivated plants, geology of soils, elementary agricultural chemistry and entomology. With the preparatory botanical study of the native forest-trees it is proposed to offer a short practical course in forestry as being of special value to the students. This portion of Kentucky comprises a region of low mountains originally well covered with hardwood timber and some Pine. While much of the valuable timber has been cut away near the railroads and along streams where rafting is possible, much timber of good quality still remains in more inaccessible places, and forest products must always constitute an important source of wealth in this portion of the state. The college is situated at the foot of the hills skirting the famous Blue Grass region of Kentucky, and the campus of forty acres of natural-forest park contains remarkably good specimens of White and Post Oak, Red, Black, Scarlet and Shingle Oak, Chestnut, Hickory, Sour Gum, Maple and Cherry. Such conifers as have been planted have grown remarkably well. The Horticultural Department of the college was formally inaugurated on October 5th in the delivery of a lecture on the Value of Special Education for Farmers, by Professor S. C. Mason, who is in charge of the department, and two thousand farmers in the vicinity were specially invited to attend. Sound instruction along these lines cannot fail to stimulate the farmers of that section in a more general and successful cultivation of garden, field and orchard crops and in the profitable use of woodlands.

Late varieties of peaches are still coming from New Jersey in small lots, and from western New York and the mountains of Pennsylvania. Bartlett pears held in cold storage are supplied from the Hudson River district and from Massachusetts; other pears grown in the east and now in our markets are Beurre Bosc, Beurre d'Anjou, Beurre Clairgeau and Kieffer, with the first shipments of Duchesse, Reine Claude and Copper plums, with a few Damsons and French and German prunes, are yet seen. During last week less than 51,000 barrels of apples constituted the supplies for this city. Since September 1st 162,485 barrels of this fruit have been sold here, less than half the quantity handled during the same period of last year, and the exports of apples from this country are thus far but thirty per cent of the quantity shipped up to this date in 1896. The first Catawba grapes, from western New York, are now here. Grapes comprised the larger part of forty-nine car-loads of fruits from the Pacific coast sold here during last week. Varieties of this western fruit now in season are the showy Flame Tokay; Black Cornichon, the long berries on loose, shouldered bunches; Emperor, a superior grape for shipping, with oblong, deep rose-colored berries; Black Morocco, less highly esteemed than some other sorts; White Muscat of Alexandria, with musky flavor; white Malaga, the oval yellowish green berries covered with a white bloom, and Black Ferrara, a favorite for home use and for shipping. Italian and German prunes are still coming from Idaho, and Coe's Late plums, from California. Glout Morceau and Winter Nelis were among the pears received from California, and Doyenné d'Alençon, Duchesse d'Angoulême, Beurre d'Anjou, Beurre Clairgeau, Louise Bonne of Jersey and Winter Seckels. The latest arrivals of peaches from the west include Salways, George's Late Cling, and Levy's Late, also a clingstone. Florida and Jamaica oranges and grape-fruit are in limited supply. Cargoes of fruit from the Mediterranean include new crop currants, figs and Almeria grapes, besides lemons and oranges, and quinces of very large size, from Italy.

By the death of Charles A. Dana American horticulture has lost one of its most conspicuous figures and liberal patrons, and GARDEN AND FOREST one of its most valued contributors. The keenest pleasures of Mr. Dana's later years were found in his garden at Dosoris, on Long Island, where he had gathered one of the richest collections of conifers and other hardy trees and shrubs that has been made in this country. Few men who are not professional botanists had a broader and more exact knowledge of coniferous trees, and he lost no opportunity to increase his knowledge and improve and extend his collections. Deeply interested in the future of American forests, he has always been one of the most persistent and intelligent advocates of forest preservation in this state and on the public domain; and in him the parks of this city have always found a vigorous and intelligent champion.

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The Massachusetts Audubon Society.

THE work of this society, founded three years ago for the protection of wild birds, has been active in circulating literature relating to them and in making known the provisions of protective bird laws, and has been conspicuously successful. It has now 1,747 life members, 330 associates, 20 life associates and 110 local secretaries. Following the lead of Massachusetts, Pennsylvania, New York, Illinois, Colorado, New Hampshire, Wisconsin and the District of Columbia have organized similar societies, and several other states are preparing to form Audubon societies. During the last year the Massachusetts Society has issued and freely sent out a number of publications relating to the protection of birds and it is now distributing at a trifling cost an illustrated paper by Miss Florence A. Merriam, entitled *How Birds Affect the Farm and Garden*.

In this publication gardeners who have not studied our native birds and their habits will find a great deal of useful information and that many of their preconceived ideas about our familiar birds and their damage to growing crops have been erroneous. Our common and friendly catbird, for example, is often prosecuted because it eats fruit, and although in some parts of the country it is to a certain extent a fruit-eater, one-third of its food is now known to consist of insects which annually destroy a large part of the farmer's and gardener's profits; even as a fruit-eater it has been demonstrated that it prefers wild fruits to cultivated, most of the complaints of depredations against the catbird coming from those parts of the country where wild fruit is scarce, and actual experiment shows that it prefers red mulberries to cherries and strawberries. The kingbird, having been long accused of destroying honeybees, a careful examination has been made of 218 stomachs of this bird. Insects were found to form about ninety per cent of the whole food, but only fourteen of the 218 stomachs contained any trace of honeybees, while it was found that it had destroyed a number of the bees' worst enemy, the robber fly, which has been known to kill 140 honeybees in a day. The kingbird, too, feeds upon other harmful insects, the gad fly, the Clover-leaf weevil, the destructive Rose chafer, ants and grasshoppers.

The chickadee is shown to be a voracious feeder on the eggs of the canker-worm; and the crow, although he does

pull up some corn and is too often maligned and abused, does infinitely more good than harm. Twenty-six per cent of his entire food has been found to consist of insects, most of which are grasshoppers, may-beetles, canker-worms and other species injurious to growing crops. He is a great devourer, too, of field-mice and other harmful rodents, and he is one of the best scavengers. Greater injustice even has been done to hawks and owls which are persecuted unceasingly, although a majority of them work night and day to destroy the enemies of the husbandman. There are only three common inland hawks in the United States which do any damage; these are the goshawk, which is rare in this country, except in winter; Cooper's, or the chicken hawk, which is destructive, especially to doves, and the sharp-shinned hawk, which feeds principally on small birds. The other so-called birds of prey in the United States are mainly beneficial, and their protection and preservation are of extreme importance. Their food consists largely of meadow mice, rabbits, chipmunks, small snakes, grasshoppers, spiders and centipedes. Swainson's hawk is the great grasshopper-eater in some of the western states, and it has been estimated that 300 of these birds have saved in a month sixty tons of produce that grasshoppers would have destroyed. Owls, too, are great destroyers of small rodents, and the story is told of the nest of one pair of barn owls from which 454 skulls were taken, of which 225 were meadow-mice and 179 house-mice.

Miss Merriam, although she pleads so eloquently and logically for the preservation of our native birds, regards the introduction of the English sparrow into this country as an unmitigated evil. First introduced in 1850, it has now become established in thirty-five states and territories, and has been shown to interfere with seventy kinds of our native birds, most of which build their nests in the neighborhood of houses or in gardens, and are beneficial to the farm and garden. An examination of 522 stomachs of the English sparrow has shown that it feeds principally on wheat, oats and corn, and is but little interested in insects, and that when it does eat insects these are more often beneficial than injurious. It would seem clear then, as Miss Merriam insists, "that the English sparrow should be exterminated, that laws protecting him should be repealed, and that some intelligent systematic action should be taken to rid the United States of his obnoxious presence. Bounty laws cannot do this, for, as has been clearly demonstrated, they do more mischief than can be easily remedied, as money is usually spent on the heads of the valuable birds that have been mistaken for the injurious ones. Small boys also are likely to do more harm than good by destroying the wrong birds, but the work might be effectively done by state boards or commissioners, who should hire trained assistants to destroy the birds in their nests."

The food of a large number of our common native birds is discussed in the pages of this publication, but we have said enough to indicate its value to the farmer and gardener and to show the character of the work which the Massachusetts Audubon Society is doing. Not less successful have been its efforts in preventing the use of the feathers of wild birds in female decoration, and every one becoming a member of the society is expected to agree not to purchase or encourage the use of feathers of wild birds for ornamentation. This, however, does not interfere with the use of ostrich plumes, which are now beautifully dyed for the milliner's trade, the feathers of the different species of barnyard fowls, and the plumage of ducks and peacocks.

Audubon societies and clubs should be founded in every city and town to excite interest in birds, and all school children should be taught their habits and value. Clubs and societies desiring speakers on the subject of birds and their protection may obtain names by addressing the Secretary of the Massachusetts Society, Miss Harriet E. Richards, at the Boston Society of Natural History, Boston, from whom the various publications of the society and suggestions and advice can be obtained.

* The aims of associations like this and the work of their members are indications of a high order of intelligence and civilization in any community, and such unselfish and patriotic effort deserves the encouragement and assistance of the public.

THE withdrawal from sale and entry of all Government land more valuable for the production of timber than for other purposes was recommended by the Commission appointed by the National Academy of Sciences to study, at the request of the Secretary of the Interior, a forest policy for the United States. The proposition was considered radical by many persons, but now it has been endorsed by the National Irrigation Congress at its recent meeting in Lincoln, Nebraska, which finds that "the perpetuation of the forests of the arid regions is essential to the maintenance of water-supply for irrigation as well as for the supply of timber for industrial needs, and resolves that the President of the United States shall be memorialized, so soon as a proper and adequate form of administration shall be provided, to withdraw from entry and sale under the Act of Congress of March 3d, 1891, all public lands which are of more value for their timber than for agriculture or their minerals." This is particularly interesting, showing as it does a great change of public opinion since the time, still recent, when some of the most influential advocates for Government coöperation in providing irrigation for the west urged that as forests were detrimental to the flow of streams they should be destroyed. It seems to show, too, that the real opposition to a conservative national forest policy comes from the great corporations who derive large profits from plundering the Government and from their paid attorneys in Congress, and confirms our own observations that a large majority of the people living in the western states and territories are anxious for the preservation of the national forests and opposed to the selfishness of the mining and timber-cutting companies. Unfortunately, however, the opponents of greed and depredation are not as well organized as the plunderers, and they are without proper representation in Washington. Public opinion, however, is gradually changing on the subject of forests in the west as well as in the east, and the time will come when the present era of wanton forest destruction will be regarded as one of the serious blots upon the intelligence and foresight of the American people.

Notes on Cultivated Conifers.—IV.

IN the last number of these notes we described those Junipers of the section *Oxycedrus* which can be grown in northern gardens. More important than these are the species included in the section *Sabina*, distinguished by the scale-like crowded leaves closely appressed and adnate to mature branches, while on seedling plants and frequently on vigorous shoots they are elongated, sharp-pointed, free and more or less spreading. To this section belong all the large and valuable species of both hemispheres and a few good garden plants, although most of these Junipers are natives of hot, dry regions and cannot bear the humidity of the Atlantic states. Eight, at least, of these arborescent Junipers inhabit the United States, and, with one exception, they belong to the west and south-west and to regions of scanty rainfall and long, hot, dry summers, and wherever Junipers of this section grow, except in eastern North America, Bermuda, the West Indian and Atlantic islands, and in Sikkim, the rainfall is unequally distributed and the soil is rocky and sterile.

One of the largest and most valuable of the entire genus, however, *Juniperus Virginiana*, which is a native of the eastern United States, is one of the handsomest and most desirable coniferous trees which can be cultivated in this climate. Common from Nova Scotia to southern Florida and central Texas, and from the shores of the Atlantic to the valley of the Missouri River, the Red Cedar, as this tree

is universally called, assumes many forms under the various conditions of its surroundings. In the valley of the Red River in Texas and Arkansas it is sometimes a hundred feet high, with a tall straight trunk three or four feet in diameter; usually it is much smaller, however, and generally forty or fifty feet in height. Sometimes, especially during its early years, the slender branches are pressed close against the stem from the base upward and form a narrow pyramidal head, which in time usually broadens out and finally becomes round-topped and very irregular. This pyramidal form is especially common in the valley of the Hudson River and in some parts of New Jersey and eastern Pennsylvania; in New England, after the first twenty or thirty years, when the Red Cedar is nearly always pyramidal, the stems often become naked below and the head a broad-based pyramid of slender branches spreading below nearly horizontally and ascending above; and in the swamps of Florida, where this tree is common and grows to a large size, the branches are long and often pendulous. The foliage of the Red Cedar is dark yellow-green, or often pale glaucous, becoming bronze-colored at the north during cold weather, and in autumn and winter, when birds do not eat them, the branches are loaded with the small berries, which are covered with a handsome whitish bloom.

Juniperus Virginiana has usually been considered to cross the continent to the shores of Puget Sound and Vancouver Island, and to be pretty widely distributed through the interior Rocky Mountain region from the northern border of the United States to northern New Mexico and Arizona. After having seen, however, a good deal of this western tree during the past two seasons, I am inclined to believe that the so-called western Red Cedar as it grows in Wyoming, Montana and Colorado, at least, and perhaps everywhere, will have to be considered another species, and should this supposition prove correct on further investigation, I should propose the name of *Juniperus scopulorum* for it. The habit of the Rocky Mountain tree is very unlike that of any form of the eastern Red Cedar, as may be seen in our illustration on page 423 of this issue, which represents a tree near the Mammoth Hot Springs in the Yellowstone National Park, where this Juniper is very common, and the only arborescent species, and where it grows on gravelly slopes at elevations of six or seven thousand feet with *Pinus flexilis*. It has the slender branchlets and opposite leaves in pairs of the eastern tree, but the fruit is larger, and does not ripen until the second year, while that of our Red Cedar ripens during its first autumn. The branches are stouter and covered with more scaly bark, and the bark of the trunk, which is often forked near the ground, is unlike that of the eastern tree, which separates into thin narrow scales fringed on the margins, but, like that of some other western Junipers, divides into irregular, narrow, connected flat ridges, which break up on the surface more or less freely into persistent shreddy scales. The wood has the same fragrance as that of the eastern tree, although it is rather less powerful, and the color is a duller red. The habit and the character of the bark may be due, perhaps, to differences of soil and climate, which might also affect the color of the wood, and the only really tangible character by which the western tree can be separated from the eastern is the biennial fruit. The fact, moreover, is significant that unless the eastern and western trees come together in north-western Nebraska, the meeting place of the eastern and western floras, they are separated by a continuous belt of country through the middle of the continent several hundred miles wide; and moreover, with the exception of *Juniperus communis*, which encircles the northern hemisphere, and the White Spruce, which crosses this continent far northward and reaches the Pacific coast within the Arctic Circle, no coniferous tree grows in both eastern and western North America. But before the question of the distribution of the Red Cedar can be satisfactorily determined more observations should be made on the time of ripening of the fruit,

especially in Colorado, Utah, New Mexico and Arizona, in the valley of the Columbia River and on Vancouver Island, for it is, of course, possible, although hardly probable, that the proposed *Juniperus scopulorum* may be confined to the northern Rocky Mountains and that *Juniperus Virginiana* really reaches the southern part of that range and even the Pacific coast.

So much has been said in the columns of this journal about the value of *Juniperus Virginiana* as an ornamental tree that it seems unnecessary to say more on the subject. Certainly no other hardy conifer can be used here so successfully to produce the effects which are obtained in countries of milder climates by the employment of the fastigate Cypress of southern Europe, and no other tree is more formal in one of its forms and more picturesque in another. None of our trees are better suited to cover a rocky knoll, or, mingled with trees of less formal outline, to give interest and variety to the landscape.

The Red Cedar, although usually regarded as a slow-growing plant, increases rapidly with generous treatment; it is easily transplanted while young from upland pastures or from the borders of fields and roadsides, where birds industriously sow the seeds, and with care plants ten or twelve feet high can be safely transplanted, although an idea prevails in this country that the Red Cedar is difficult to move and unsuited for cultivation.

Many varieties of the Red Cedar are found in gardens, nurserymen propagating them by means of cuttings. Most of these, however, are hardly distinct enough to warrant attention, the only conspicuous varieties being those with glaucous foliage (var. *glauca*), one with pendulous branches descending along the stem (var. *pendula*) and one of the best of all the weeping conifers, a dwarf form (var. *globosa*), and forms with leaves more or less disfigured by yellow or white markings. *Juniperus Virginiana gracilis*, usually known in English gardens as the Bedford Juniper, is distinguished by slender, somewhat pendulous branches and bright green foliage; it is a plant of somewhat doubtful origin, and may have come from Florida, as it is tender even in England. If it has been tried in our northern gardens, it probably has not survived in them.

Juniperus Chinensis, which is occasionally found in our gardens and is perfectly hardy as far north as eastern Massachusetts, is in every way inferior as an ornamental plant to the native Red Cedar which it somewhat resembles, and at the end of a few years usually becomes ragged and shabby in appearance. But this species is interesting, however, in the difference of the foliage of the staminate and pistillate plants, at least while young. On the male plant, which has usually erect much-divided branches, the leaves are usually in threes, acicular, rigid, spreading, and bright green or glaucous, while on the female plant, which has longer and often pendulous branches, the leaves are scale-like, closely appressed, opposite in pairs, and glaucous-green; the two forms, however, are frequently found on the same individual, and on old trees in Japan the leaves are all scale-like and rather glaucous. *Juniperus Chinensis* is widely distributed in eastern Asia, from the borders of Thibet to Japan, where it does not appear to be generally scattered, although it is common on the high volcanic ridges at the base of Asama-yama in central Hondo; here it becomes a shrubby tree thirty or forty feet high, with straggling contorted branches and gray-green leaves. Two venerable and picturesque specimens, seventy or eighty feet high, with hollow trunks some six feet in diameter, before the temple of Zenkōgi, in Nagano, show that this Juniper sometimes attains a large size. In gardens there are forms of *Juniperus Chinensis* with bright yellow and with white marked foliage; these are slow-growing and rather delicate plants of no particular value or interest. Another form, usually known in gardens as *Juniperus Japonica*, is in early life a compact bushy plant with many erect branches and acicular blue-green leaves. This shrub, which is probably a product of Japanese horticulture, as it is often cultivated in Japanese gardens, is perfectly hardy and very

distinct in appearance from other Junipers; retaining for several years its peculiar compact juvenile habit, it too often becomes thin and ragged before it is a dozen feet high and loses its value as an ornamental plant. There are varieties of this form in which the young branches with their leaves are yellow or white. This is, perhaps, one of the most difficult of all conifers to transplant.

By many recent authors the so-called *Juniperus Japonica*, which does not appear to be known in a wild state, has been confounded with the prostrate littoral Juniper of Japan and Corea (*Juniperus procumbens*, Siebold.—*Juniperus Chinensis procumbens*, Endlicher), now usually considered a variety of *Juniperus Chinensis*, although perhaps it will, when better known, be found distinct enough to be given a specific position. This seashore plant forms dense mats on low grassy bluffs fully exposed to ocean gales, sending out for long distances its prostrate creeping stems clothed with bright green scale-like leaves. From seeds gathered near the Aino village of Horobetsu, on the coast of Yezo, a number of plants have been raised in the Arnold Arboretum, but it is too soon to speak of their hardiness.

Another prostrate Juniper (*Juniperus Sabina*, var. *procumbens*) is an excellent garden plant with wide-spreading stems which hug the ground and are clothed with bright green foliage. This is now usually considered an American variety of *Juniperus Sabina*, which is an erect shrub or small bushy tree, occasionally twelve or fifteen feet tall, and is widely scattered through central and southern Europe and Siberia. If it has ever been properly tried in our gardens it has probably not proved hardy. The American plant is distributed from southern Maine to the shores of Hudson Bay, and westward in British America from Newfoundland to the Rocky Mountains of southern Alberta, and through northern New England and New York along the shores of the Great Lakes to northern Minnesota and over the mountain ranges as far as the eastern slopes of the Rocky Mountains in Montana. This is the hardiest and most beautiful of all the prostrate Junipers which can be grown in our gardens, where it might well be seen much more frequently than it is.

The prostrate form of the Himalayan *Juniperus recurva* (var. *squamata*) is a favorite garden plant in Europe, and has frequently been planted in this country. In Massachusetts it is not very hardy, although it can be made to grow in sheltered shady positions; near New York and southward it is, however, perfectly hardy. *Juniperus recurva*, which is widely distributed from Afghanistan to Sikkim and Bootan, is sometimes tree-like, but at high elevations remains shrubby and covers large areas with long decumbent stems running on or just below the surface of the ground and sending up numerous short erect branches.

Considering the number of species and forms of *Juniperus* and the attention which has been given in other countries to preserving all its abnormal forms, the genus has contributed comparatively little to our gardens, and as an ornamental tree for eastern America no other species or variety compares with our native *Juniperus Virginiana*.

C. S. S.

The St. Croix River.—I.

MAINE AND NEW BRUNSWICK.

IT is a far cry from the western St. Croix River to the St. Croix River on the eastern boundary of the United States, but there is a kindred beauty in the forests which border them.* The same flowers bloom near them, the dancing foliage of Birches and Rowan, the stern symmetry of Fir and Spruce are similar in both. But there is a quieter stateliness about the Maine river as it opens out into the broad bay of Passamaquoddy, with its myriad islands, and a more majestic flow in its tide, which rises to unusual height from the influence of the Bay of Fundy. There is,

* See Dalles of the St. Croix, Wisconsin and Minnesota (GARDEN AND FOREST, vol. x., page 330).

too, a richness of red color in its beaches and rocks, which gives the landscape a depth of tone rare in a northern latitude, while the clear atmosphere lends sharpness to outlines and affords a wide perspective. The scene is most beautiful when the soft autumn hazes slightly veil the lofty hills and enhance the mystery of the blue distance. When mingled, as it too often is, with the smoke of burning forests, this haze adds a purple tint to the headlands like the enchanted mantle Vesuvius spreads over the jagged lava crests which encircle the Bay of Naples. To one who sails up and down the river the differing views rival each other in charm. Descending, there is seen the gradual widening of the stream and an increasing dignity in the bluffs which rise on either hand; returning at evening up the slowly narrowing channel, the heads of the high hills are violet against a golden sky. Though there are other scenes more rugged and wildly picturesque, few exceed this in noble, tranquil charm.

Some years ago forest fires and the devastation of lumbermen had left the banks of the St. Croix stripped and desolate, and had thrown into mournful relief their rocky sterile fields and hillsides. Now gentle Nature has re-clothed the dreary wastes. The Devil's Head is green with a young and vigorous growth, above which rise here and there to a great height the gaunt skeletons of burned Pines which show how tall the virgin forest once was. This gradual reforestation of the burnt lands of Maine and New Brunswick is very apparent along the railway from Bangor which leads to the headwaters of the St. Croix. Where ten years ago there was but a blackened waste countless numbers of Ashes, Maples, Birches, Moosewoods, Larches, Hemlocks and White Pines are now springing up, interspersed with stiff young Spruces and Firs. The wet lands and scorched moors are hidden by Blueberry-bushes and Alders, and everywhere the red berries of the Dwarf Cornel glow amid their whorls of foliage. Behind St. Stephen, New Brunswick, are piled high ridges of hills, from which one has a wide view over the broad desolate landscape now fast recurring to woodland. To the eye accustomed to the rounded outline of clumps and masses of trees, the serrated edges of the Firs and Spruces climbing up and down the hills seem strange and harsh. The Balsam Firs (*Abies balsamea*) send their top shoots into the air, and sometimes for two or three yards their branches are so short and widely separated that they are almost as unlike trees as the telegraph poles. The groves of Spruce (*Picea rubra*) are sombre and funereal. The bluer, pale, glaucous hues of the White Spruce (*P. alba*) here and there give a brighter tone to the clearly massed ranks of evergreens, or the Hackmatacks (*Larix laricina*) interweave the dark warp with a woof of feathery lightness. Hemlocks (*Tsuga Canadensis*) abound, and their graceful forms and delicate foliage make them the queens of the forest wherever they appear. Where the sun can reach them, on the hillsides and on the edges of the swamps, wave the serrated leaflets of the Mountain Ash (*Pyrus Americana*), whose tops at this season are gay with shining bunches of scarlet berries.

All these trees are found in profusion on the banks of the St. Croix, many of them growing apparently from the heart of the solid rock. Along the sheer banks of the cliffs which rise directly from the salt tide, I saw blocks of stone cleft by the pressure of the strong roots as if by the tools of a quarryman, lying in square masses where they had been hurled down the slope by the force of the vigorous shoots. What these trees live on, beside the rain from heaven, is always a mystery, but they are undaunted by the hard conditions of climate and soil, and though they grow very slowly they still live and thrive where no one would believe a living thing could find sustenance.

Salmon Falls, a mile above the head of navigation of the St. Croix, were beautiful within my memory, and along the banks of the river at the point where they roar and tumble over the rocks into the basin below, I well remember the conical bark wigwams of the Passamaquoddy Indians which

I used to wonder at in my youth. A remnant of the tribe still haunts the old grounds, but their homes are no longer picturesque. Tumble-down old sawmills vex the course of the stream, and their refuse and sawdust form little islands on which tall bushes, and even trees, grow freely. At Calais the tide rises twenty-five feet, and when it falls leaves but a narrow channel between wide stretches of mud-flats, so that the river's beauty ebbs and flows periodically for a mile or two. But lower down, the pebbly or sandy beaches of vivid red which alternate with the high bluffs of differing shapes, are always fine, even when the tide has receded to its utmost limit.

This river was discovered and named by the French, under Pierre du Guast Sieur de Monts, in 1604. The name Ste. Croix was then given to it on account of the two branching arms made by the mouths of two rivers visible from the little island on which the small garrison established itself and built a fort and houses, which one finds rudely portrayed in *Champlain's Voyages*. One of the arms on the British side is now known as Oak Bay, and into it flows the River Warweig, from the valley of which rises a curious group of round, heavily wooded hills, clustered together in a way that suggests some extraordinary convulsion of Nature, or a Titanic game of bowls, with the balls left deserted in a huddled mass. From the lofty ridge in New Brunswick, which overlooks this singular scene, the view is remarkably beautiful. Landward, great moor-like stretches dotted with woods reach away in every direction to a far-distant horizon line, broken here and there by faint purple hills, and directly below one's feet are seen lying the round or conical dark hills, clustered together and often actually rising from the waves. Over the tops of them in the shadowy distance are visible the blue waters and the far-away shores of the myriad islands of Passamaquoddy Bay. Just above St. Andrews, New Brunswick, the highest mountain of all, Chamcook, lifts a bare red top from a fringe of encircling woods. Its old red sandstone formation shows this hill to have been one of the early upheavals on the continent, and although it is not five hundred feet high, nothing grows upon its summit. From it one has a comprehensive view of all the surrounding region on both sides of the St. Croix, dotted with myriad lakes, and can behold the broad bay with its hundreds of islands of varying extent.

Hingham, Mass.

Mary C. Robbins.

Foreign Correspondence.

London Letter.

MISCANTHUS.—We have in cultivation at least three, possibly four, of the six or seven known species of this genus. They are better known under the name of Eulalia, now sunk under *Miscanthus*, a near ally of the Sugar-cane, *Saccharum*. These ornamental plants are useful in the mixed border or as isolated specimens on the lawn. The oldest species cultivated in gardens, *Miscanthus Japonicus*, is now represented by three distinct forms. The type has culms six or eight feet high and three-eighths of an inch in diameter; these are clothed with elegantly curved leaves three feet long and about an inch wide, glabrous above, hairy beneath, the sheaths also hairy, the midrib white, the other portions bright green. In the autumn they bear terminal erect panicles of purplish flowers like those of the Sugar-cane or the male plumes of the Indian Corn. The variety *Zebrina* has leaves like the type, with the addition of broad, irregular, transverse bands of yellow. The third form, called *Japonicus variegatus*, is a plant of especial beauty. Its culms are six feet high and a quarter of an inch in diameter; the leaves are from two to two and a half feet long and from half an inch to an inch wide, glabrous both in blade and sheath, the former green with a central stripe of white and broad marginal bands of creamy yellow. I suspect this is another species, and not a form of *M. Japonicus*, but it has not yet flowered. According to Walters, who collected *M. Japonicus* in Formosa

in 1882, it is grown by the Chinese for fuel and thatching, and is a large stout Reed. *M. Sinensis* is distinguished by its shorter, thinner culms, which at Kew attain a height of five feet and are less than a quarter of an inch in diameter, while the leaves are two and a half feet long, a quarter of an inch wide, channeled their whole length, and shining green, with a white stripe along the midrib. The sheath is glabrous and covered with a wax-like bloom, and there is a tuft of long silky hairs on each side of the ligule. This species is a native of China and Japan. It was introduced by the French horticulturists in 1889 under the name of

and other parts of China. Planted in strong deep soil, where they will get plenty of moisture and sunshine, these plants are seen at their best and show to advantage in comparison with those grown under less liberal treatment.

PHRAGMITIS COMMUNIS VARIEGATA.—This is a highly decorative variety of the common Reed, the *Arundo Phragmitis* of Linnæus. A small plant of it was presented to Kew four years ago by Messrs. Wallace & Co., of Colchester, and it is now a mass of stems ten feet through and six feet high, clothed with leaves a foot long, an inch wide, and green, striped and margined with creamy white, the sheaths



Fig. 54.—Juniper in Yellowstone National Park.—See page 420.

Eulalia gracillima, var. *foliis univittatis*. Under the name of *M. Ogi* we have a third species which was introduced from Yokohama in 1895. It is as hardy as the others, larger than they are, and at least as handsome. In the Bamboo garden at Kew it has formed a cluster of about fifty stems nine feet high and half an inch in diameter, the leaves three feet long, one and a half inches wide, and dark green, with a white stripe along the midrib, the sheaths glabrous and tinged with purple, the ligule bearded. It promises to be a plant of exceptional value in the garden. The specific name looks like Chinese or Japanese vernacular. Possibly it is *M. sacchariflorus*, a native of Peking

partly rose-purple, partly green, and the band round the ligule black-purple. It is by far the most ornamental form of this Reed known to me, and it is an ideal plant for the water-side. It was, I believe, found by Dr. Wallace as a sport from the type, which is common in wet places in this country, and he took it into his garden and found the variegation was permanent. Possibly the stems would grow to a height of eight or ten feet in a warmer situation than the margin of the lake at Kew. It must not be confused with the Gardener's Garters, *Phalaris arundinacea*.

LAPORTEA CANADENSIS.—I lately saw a large quantity of this plant under cultivation in the Jardin d'Acclimatation,

Paris, and on inquiry I was told by Monsieur Patry, the superintendent of those exceedingly well managed gardens, that it was being distributed to the French colonies as a silk-fibre plant, and that in this respect it is superior to the China Grass, *Bœhmeria nivea*, and to Ramie, *B. tenacissima*. It has been found to grow more freely and to be less difficult to manipulate than either of these two plants, which, according to Monsieur Patry, have consequently been abandoned in its favor by the French planters. I see that this species is a common weed in various parts of North America, and that its fibre has been utilized for textile purposes. In the *Treasury of Botany* it is stated that *L. Canadensis* is a native of the Alleghany Mountains and that "it has lately (1884) been imported into Germany as a new textile plant; it is perennial and capable of enduring the climate of central Germany, but further experiments are needed ere its commercial value can be determined." In view of the fact that these silk-fibre plants are exciting considerable attention among manufacturers, and of the belief in France that this *Laportea* is better than either of the *Bœhmerias*, it would be worth while for some one in America to investigate its properties. Very little appears to be known about it in England, where fibre plants of all kinds have received considerable attention in recent years.

TIGRIDIAS.—What are the natural conditions under which *Tigridia Pavonia* grows in Mexico? Cultivators generally treat this and the other species of *Tigridia* as plants that require a comparatively dry situation. In the gardens of the Earl of Ilchester, at Abbotsbury, however, *T. Pavonia* is grown in a swamp and it thrives amazingly, growing to a height of three feet, the leaves large, healthy and lustrous, and the flowers almost as large again as one usually sees them. It has been in this position several years and has increased rapidly. Possibly this is a case in which the cultivator is more kind to the plant than Nature can afford to be. An instance of this character is *Begonia Socotrana*, which Nature grows in dry hot sand; in the hands of the cultivator this plant is happiest, that is, it grows at least three times as large and bears enormous crops of flowers, when planted in strong loam, freely watered and kept in a hot, moist stove. Another such case is *Stapelia gigantea*, the largest flowered of all the carrion plants. At Kew it is grown in a stove with *Crotons*, *Dracenas*, etc., where it blooms freely, and it is now coming into flower. On seeing our plants a few days ago a Cape botanist exclaimed that this method of cultivation would kill the plant. But, in a house where succulents are grown at Kew, it grew indifferently and never flowered. By the way, cultivators of *Stapelias*, plants which often fail to grow, may like to know that altogether the best method I have tried is to plunge the pots containing them during the summer in cinder-ashes in a frame facing south, where, in warm weather, the lights are taken off. The Kew collection has improved astonishingly under this treatment.

HOW NEW PEAS ARE RAISED.—The history of garden vegetables is a subject of absorbing interest. Darwin devoted much attention to them in his *Animals and Plants under Domestication*, a work which, I venture to think, present-day horticulturists might study with advantage. In the course of a lecture by Mr. A. W. Sutton, of Reading, on the progress in vegetable cultivation during the last sixty years, it was stated that a seedling Pea is now generally the result of so much interbreeding that many distinct types will be represented in the ultimate cross. This cross will give a pod containing from six to ten or more seeds, and it is at this point that the work of the hybridist ceases, and that of the selector commences. When sown these seeds will in all probability produce as many distinct seedling Peas, some partaking of the character of the parents and some not. Seed saved from each of these frequently varies in each case to such an extent that the greatest patience is required in order to secure any fixed type at all. Some will be tall, some dwarf; some early, others later; some large podded, some small; some pale green in color, some dark; some curved in the pod, some straight; some pointed at the end and

some square; and last, but not least, some may be round-seeded and some wrinkled. The selector must therefore begin again, and starting from the most promising plant in each row, endeavor to build up a seedling plant which will reproduce itself from seeds without variation, a task often extending over many years. While the garden Pea has been enormously improved during the last sixty years, *Ne Plus Ultra*, raised fifty years ago, is still, perhaps, the best of all tall late marrow-fat Peas. Another popular favorite now is *Veitch's Perfection*, introduced in 1859. American Wonder, introduced by Messrs. Sutton in 1881, is still more extensively grown than any other dwarf wrinkled pea. Mr. Sutton also stated that in order to make their Pea trials comprehensive enough to determine the value of new seedlings, and to test older varieties offered, they find it necessary to sow from 600 to 700 rows annually.

London.

W. Watson.

Cultural Department.

Notes from Baden-Baden.

SCABIOSA CAUCASICA is one of our hardiest perennials in all soils and positions, and it produces its beautiful pale blue flowers throughout summer and autumn. A variety called *Connata* or *Elegans* has larger petals, and is altogether a more robust plant. There is also a white variety, but this is more delicate than the type and capricious as to soil and treatment. I have worked constantly for many years on *S. Caucasica connata*, sowing and selecting the best varieties, even though the variation was slight. This season I have been successful in getting a plant with bright deep ultramarine flowers, and another with pure white flowers. The latter is very robust and much more valuable than the typical white-flowered form.

Incarvillea variabilis has been in flower since June, and is a plant well worth growing. It is half-shrubby, making a round bush three feet high and of the same diameter. The main stem branches into many divisions, the ends of the branchlets bearing the flowers, which are bright purple and about the size of those of a florist's *Pentstemon*. The leaves are bright green and deeply cut. It is quite hardy and flowers the first year from seed.

Among *Kniphofias*, a new species, *K. Tysoni*, has flowered here; it is a large stately plant, with rather short bluish green leaves at least five inches broad and two feet long. The flowers, although not gaudy, are bright brick-red, changing to white.

Crocus pulchellus was in great beauty some time ago, with soft purple flowers, faintly striped. At this time, October 10th, *C. Marathonis* is showy, its pure white flowers being brightened by a few orange blotches and the broad orange pistils. *Polygonum sphærostachyum* still throws up its handsome spikelets dressed in bright aniline-red.

Baden-Baden.

Max Leichtlin.

Ornamental Grass Beds.

IT is rather puzzling to know why so many *Coleus*, *Alternantheras* and annuals are used in our public gardens and parks year after year when there are many other plants of as easy cultivation and much more pleasing. Beds of *Coleus* are little more than patches of gaudy color, with which one is quickly satiated. In this locality there are beds planted permanently with Grasses; these are made to look different each year by introducing various species of moderately tall flowering and foliage plants. In planting with Grasses the tall Reed, *Arundo donax*, is given the central position; next in height is *Erianthus Ravennæ*, and the varieties of *Eulalia Japonica* with *Arundo donax variegata* come next. *Eulalia univittata* follows in this order, and if smaller Grasses are needed, some of the variegated *Arundinarias*, *Pennisetum longistylum*, *Elymus glaucus* and *Festuca glauca*, the last-named being quite a dwarf variety. All of these Grasses are hardy here, and the plants should be placed far enough apart so that there will be no necessity to change them for several seasons.

If it is desired to use only Grasses and allied plants we have *Cyperus Papyrus*, which grows next in height to *Erianthus Ravennæ*. The color of this *Cyperus* is a rich dark green, unlike that of any other Grass. The purple form of the Sugar-cane, *Saccharum officinarum*, var. *violaceum*, can be depended on to grow at least five feet in a single season and form a neat bushy plant. *Cyperus alternifolius* attains a height of from three to four feet, and *Pampas Grasses* from two to four feet,

according to the variety. The lemon-scented Grass, *Andropogon citratus*, soon makes a dense growth several feet in diameter and two feet high. All of these tender plants, with the exception of the *Cyperus Papyrus*, are kept over winter in a half-dormant condition. The *Cyperus* should be kept moving, but only one or two plants need be taken indoors when there is sufficient accommodation for propagating it. The best method is to put some growths with the roots shortened back into the damp sand of a warm propagating-house; they will put out strong working roots in a few days. If potted and kept growing in soil which contains a good quantity of chopped sphagnum-moss, the plants will form grassy growths which should be torn apart and treated in the same way as the parent pieces. From one plant at the start several hundred may thus be had by planting-out time.

If flowering-plants are desired for use with the Grasses the large-flowered Cannas are pleasing. These are becoming so abundant in variety that several of the old kinds are almost lost sight of. The old *C. Ehmannii* is unsurpassed for rich leaves and flowers; the large flowers are in nodding spikes, with little or none of the seedy appearance common to most of the newer varieties. This variety grows from four to six feet high. While the common kinds keep well over winter when dried off, *C. Ehmannii* is best wintered when kept slightly moving. *Hibiscus coccineus*, a noble herbaceous species from the southern states, thoroughly hardy here, and probably so in most places if a little protection be given to the roots, should head the list of the most desirable tall-growing herbaceous plants. Specimens with single stems will grow to a height of about eight feet; by stopping the growths early in the season low and bushy plants may be had. The flowers are bright scarlet, larger than those of the forms of the shrubby *H. rosa-sinensis*. The leaves are five-parted on long stalks. Altogether this is one of the best plants to use with the Grasses. In places where it is not hardy, the roots being thick and of a succulent nature, they may be treated similarly to those of the Dahlia. For dark foliage plants we have Black Beauty Canna from two to four feet in height, and *Strobilanthes Dyerianus*, from one to two feet high.

Botanic Garden, Washington, D. C.

G. W. Oliver.

[It is usually a mistake to grow the various Grass species closely together either in masses or lines, as is too often the practice. The charm of these plants consists mostly in the beauty of form found in the graceful lines of their leaves and stems. While many individual species of Grasses are handsome, hardly any two compose well in garden borders, unless, possibly, when it is desired to clothe the ground with a low-growing Grass or with a *Carex*, under some of the nobler species. But otherwise each species should stand in isolation, for, aside from preventing confusion of form, there are no plants whose lower parts require less masking than the Grasses, Sedges and Bamboos. Even the tall *Cyperus pungens*, which has smooth round stems six or seven feet high, and only a crown of leaves at the top, is much more effective unmasked, and one certainly would not give *Papyrus Antiquorum* a near neighbor to hide its sturdy stems. In fact, the same may be said of all the nobler or smaller Grasses, tender or hardy, and no plants will better repay thoughtful care in the selection of their location in the garden.—Ed.]

Grafted Stock for Roses.

LATELY I have had frequent opportunity for noting the advantages of using grafted stock for Tea and other Roses. The favorable conditions under which Roses have been grown in this country, and the facility and cheapness with which they can be propagated from cuttings have placed grafted plants at a disadvantage. The grafted plants must be bought in most cases, owing to lack of skill and facilities for preparing the stock. Shrewd growers, with the Old World instinct, have never lost sight of the advantages of grafted stock, and the superior quality of the flowers grown by them has led to an increase in the number of grafted plants. Clear practical instructions for working the plants have been given in *The American Florist* by Mr. Robert Simpson. Grafted plants of American Beauty show by their increased vigor just how much of the bed is planted with them, and this is true of Tea Roses. The stock exercises an invigorating influence. Perhaps the most notable success has been with grafted plants of Mrs. Pierpont Morgan. Mr. Montgomery, of the Waban Rose Conservatories, thinks they owe their comparative freedom from the dreaded eel-worm to the continuous use of grafted stock,

and cuttings from these plants are less liable to this pest. Only the Manetti is recommended for stock for Tea Roses. It is itself much of a perpetual, and on this account is preferred to all others. The Banksian has been tried; this is too rank, the plants become soft, and produce poorly-colored flowers, although it is an excellent stock for climbing Roses. The Brier Rose follows its natural bent, going to rest in winter.

Grafted plants differ in appearance from Roses grown on their own roots; the dark velvety leaves are more plentiful, and the long stems, which usually come only from the base on plants on their own roots, break from any part of the grafted plant. Where solid benches are used, grafted plants are of further advantage, as with a little trimming the plants can be carried over two or three seasons, a practice rarely possible with plants on their own roots.

Wellesley, Mass.

T. D. Hatfield.

[The points in favor of grafted Rose stock have been strongly stated recently in horticultural journals in this country, but it has yet to be satisfactorily demonstrated that grafted stock produces any better results in the long run in America.—Ed.]

Correspondence.

Garden Annuals from the Plant-breeder's Standpoint.

To the Editor of GARDEN AND FOREST:

Sir,—Early in 1897, Professor L. H. Bailey sent to the seed firm which he thought catalogued the greatest number of annuals an order for a packet of seeds of every kind of garden annual, hardy and tender. About six hundred different sorts have been growing at Cornell this year, and I have been looking over the whole field from the plant-breeder's point of view. I dare say no one ever goes to a botanic garden and looks for a business opportunity in plant-breeding, as one might investigate any other commercial opening. Doubtless a man gets a reputation for pedigree Pansy seed because he loves Pansies and must grow them for his own pleasure and profit. Cross fertilizing is essentially an enthusiast's work and no one can be hired to be enthusiastic. Then, too, there is greater success to be won in working with popular favorites than in trying to introduce new plants, just as more kinds of Grapes are needed, rather than new kinds of Juneberries. Nevertheless, there are certain results which can be obtained only from comparative study of collections that are as complete as it is possible to make them.

I have made a list of the twenty-four most popular kinds of garden annuals. Half of these I have listed as old-fashioned, and the other half as the popular favorites at this time. Balsams (*Impatiens*), African Marigolds (*Tagetes*), Moss Roses (*Portulaca*), Stocks (*Mathiola*), Candytuft (*Iberis*) and Godetias are all old-fashioned flowers and are likely to be always cherished, though their greatest popularity is probably past. Their horticultural evolution seems to be finished. We have found out their limitations, and they have been so well developed that one may purchase just what is desired in the way of color, form and habit much as one would purchase manufactured commodities. The next six kinds of flowers were perhaps equally popular once, but are now neglected in the reaction against formality and artificial coloring. These are *Datura*, Prince's Feather (*Amaranthus*), Cockscomb (*Celosia*), *Ageratum*, *Clarkia*, and the summer *Chrysanthemums*. They also seem less versatile than the six first named. Their limitations are naturally closer and the named horticultural varieties are not so numerous. Prince's Feather had a general use in gardens, but the species of *Amaranthus*, which are cultivated for their foliage, are, nowadays, with the *Ageratums*, chiefly employed for the special purpose of making beds and borders. Even if the natural school were not in the ascendant, with its restricted and isolated use of flowerbeds, I should feel compelled to exclude bedding plants from the present discussion. Their value is determined by a set of characters (behavior under the shears) which is unimportant in the case of the home garden.

Of the twelve kinds on this list of present favorites all, I think, are by nature entitled to permanent prosperity, and six at least are versatile to the point of bewilderment. Pansies, Poppies, Sweet Peas, China Asters, Phlox and the various species of *Dianthus* represent six entirely independent and non-competing types of beauty. Like and dislike, however, are matters of personal liberty, and from the present standpoint I shall try to leave out the element of beauty. Aside, then, from individual preference for one type of beauty, certain ideals of garden cultivation seem to be most nearly realized

by *Phlox Drummondii*. The varieties of *Phlox* are compact and neat in habit, have no untidiness of foliage after blooming, are hardy, easy of cultivation, prolific, continue flowering over a long season, and are lasting as cut flowers. The range of color is wide. In form *Phlox* presents little variation, the typical and the cuspidate being, perhaps, the two kinds commonly recognized. Sweet Peas, which have most of these traits of a popular garden favorite, with the added charm of fragrance, can consistently be placed in this list, although I exclude the Morning Glory and all other climbers, because Sweet Peas are much cultivated in the garden proper, while the fitting place for the Morning Glory is about the house. China Asters would be almost ideal if they were earlier. The general grower has neither time nor money to prolong their season by indoor starting and successive sowings. Whether the species has been pushed to its limits of earliness or not I cannot say. It is said that the China Aster is essentially a cool-weather plant. Of Pansies, Poppies and the Pink or *Dianthus* tribe I shall not try to define the limitations, and I hope they will never lack for appreciation, selection and education. The other half of the present list contains six kinds of plants with narrower limitations, and consequently less versatility, judged by the number of advertised named varieties. The California Poppies (*Eschscholtzia*) have a narrower range of color than the common Poppies, and I fear it is impossible to get them to speak through the glorious reds. Verbenas have about the same range of colors as the *Phlox Drummondii*, with little variation in form and a less desirable habit for ease of cultivation, but the advantage of fragrance. Petunias are also somewhat awkward to care for; their smell and touch are unpleasant to some, and fixation of character can never be as perfectly attained as in the other groups mentioned; and in the case of the double forms hand fertilizing is necessary. Coreopsis and the Corn-flowers have still narrower limitations, but I believe they are among the twelve favorite garden annuals to-day. Most persons will be content if these are not much changed. It is difficult to see any benefit to be derived from crossing three such distinct types as Corn-flowers, Sweet Sultans and *Centaurea Americana*, all of which belong to the same genus. Mignonette, with its special uses and the narrowest limitations of the twelve, completes my naming of the twelve garden annuals most popular at present. The lovers of Dwarf Nasturtiums, Gaillardias, Calendulas, Cosmos, Sunflower and Zinnia will think these deserve a place among the best twelve. I should include them in a list of eighteen.

I do not mean to say that this list of twelve contains the best annuals, but merely those most popular. They are not the twelve which are indispensable for my own garden. I also believe that this list excludes two that are most promising to the plant-breeder. Cosmos is comparatively new to the east, and we do not know its limitations, but all agree that it has great possibilities. The great need with Cosmos is the hastening of its blooming time. Zinnia, once a general favorite, but now neglected, has, I am sure, great possibilities. It must probably always have a deep flower, but it need not be stiff and formal. If the Japanese or the Chinese had had Zinnias to work with all these centuries we should now have some fanciful forms. The Zinnia and the Dahlia were not known outside of Mexico until this century. The tropical climate, it is said, is not suited to double forms, and people of the tropics are not garden lovers. The double Zinnias and Dahlias were among the most consummate expressions of the florist's art at a time when artificial flowers were the craze to the exclusion of forms that are loose, irregular and free. The color range of Zinnias is very wide, and of the yellow series, while China Asters have the blue. Zinnias are earlier than China Asters, and their profusion of bloom, lasting qualities and ease of cultivation are nearly ideal. Nobody wants them for cut flowers, but that is because stiff and formal flowers are out of fashion. Can new forms and new informality be bred into the Zinnias? I believe so. Plant-breeders are experimenting with Dahlias, and both Dahlias and Zinnias have much in common with the varied China Asters and fanciful Japanese Chrysanthemums.

Ithaca, N. Y.

Wilhelm Miller.

The Forest.

The Forest Reservations of Southern California.

AMONG the forest reservations set aside by executive orders of President Harrison and President Cleveland are three of great importance to southern California. These reservations are known as San Gabriel, San Bernardino and San Jacinto, and aggregate more than two million acres. The smallest is that of San Gabriel, the most westerly. The San

Bernardino and the San Jacinto reservations, each of 737,280 acres, are about ninety miles from the ocean, on the slopes of the Sierras, which separate the fertile cultivated valleys of southern California from the Mojave and Colorado deserts. The longest slopes are toward these valleys, and are traversed by the numerous mountain streams which supply the whole section with water for irrigation and domestic purposes. From the bases of the mountains on the north and east stretch away broken, undulating and barren desert wastes, watered only by infrequent springs and wells.

The San Bernardino and San Jacinto reservations are almost continuous, being separated by the narrow pass of San Gorgonio. Together they form a large and immensely valuable forest reserve, which includes the three highest mountains in southern California, San Bernardino, San Gorgonio (sometimes called Grayback) and San Jacinto. San Gorgonio is the highest of the three, about 11,500 feet, but they are all noble and imposing. On San Bernardino and San Jacinto there is a sparse growth of timber nearly to the summit, but the timber line of San Gorgonio is several thousand feet below the summit, and the gray appearance of its barren crest, covered with masses of broken rock, has given it its popular name. Late in September of the present year I saw on the northern slope of San Gorgonio scattered patches of snow, the remnants of last winter's falling, and a day or two later its summit was whitened by the first light snow of the coming winter season.

The forests of these mountains do not compare in extent and majesty with those of northern California and of Oregon. From the lumberman's point of view they are insignificant, and, at a little distance, the transient tourist who views them only from the south and west, sees no forests worth mentioning and goes away with the impression that the slopes of the mountains are all barren. But when the cañons and the valleys are penetrated that lie between the successive ranges, especially in the north and east, forests are found that are certainly beautiful, if not of great commercial value. At intervals there are stretches where the Pines have crowded out all other trees, and one may ride for miles unimpeded by underbrush among their huge and towering trunks. But most of the forests are composite, principally made up of Pines, Firs, Balsams, Spruces, Larches and deciduous and Live Oaks. The streams are bordered by Willows and Alders. Occasionally a puny Maple is seen, very unlike the handsome Maples of the east, and the Bay-tree flourishes at certain altitudes. The forests of this region are between the altitudes of 4,000 and 8,000 feet.

In places the Chapparal is dense, made up of Manzanita, Buckthorn, wild Mahogany, the Madroña, Greasewood, etc. Some of these bushes are covered with long, silvery, frond-like blossoms or, as the Manzanita, for example, with red or scarlet berries. Holly and Mistletoe are frequently found, and many gay flowers, such as the Golden-rod, Clematis and the bright blossoms of various species of Cactus. Where there is moisture there are many varieties of Ferns.

These mountains were formerly overrun with animal life, but the too-ready rifle of the hunter has changed this condition. Grizzly and cinnamon bears and wild cats are still found occasionally in the deepest recesses. Deer are comparatively plentiful and hundreds are shot every season. Gray squirrels abound, although they are by no means as numerous as in former years. Brown squirrels and chipmunks, too insignificant to tempt even the most wanton marksman, are abundant. The streams are full of trout and are kept replenished from year to year from state hatcheries. The same variety, the California brook trout, in the waters of the only lake of this region, grows to enormous size. This lake also affords fine duck-shooting in the winter. The mountain quail, larger and handsomer than the quail of the valleys, is found in numbers. Doves are also plentiful. Among birds not fit for food are blue jays, woodpeckers, owls, hawks and condors. Of reptiles the rattlesnake is the only one of importance. Theoretically this venomous creature is a terror to many, who for this reason are unwilling to enter these regions. Practically, one may ride for days without seeing a single specimen, and the instances of injury from its bite are rare indeed.

A resort known as Seven Oaks is the centre of one of the most beautiful of the park-like districts among these mountains. This is a collection of tent-houses and log-cabins where hospitality is open-hearted and without ostentation, and where good company and good cheer may always be found. Here one may rest and study Nature or may plan and execute a great variety of fishing, hunting and camping excursions. The most convenient route to reach Seven Oaks is by wagon twelve miles from Redlands to a point near the western base of Mount San Bernardino. Thence a mountain trail, nine miles through

the forest, takes the traveler to his destination under the northern base of the same mountain. It is difficult to understand, without actual experience, how completely this day's ride isolates one from the busy workaday world.

On every hand mountains rim the valley in which Seven Oaks lies, with a distance of, perhaps, twenty miles in each direction from ridge to ridge. The Santa Ana River, the most important stream in this section of southern California, traverses the valley from east to west, finding its sources at the greatest elevations and fed by smaller tributary streams. From the heights above these waters one may look down, toward the east, upon the wide stretches of the deserts, broken by ranges of low hills with great variety of color and topography.

The Santa Ana curves to the northern side of this valley and between it and the heights of San Bernardino and Grayback, on the south and south-east, are wooded benches where one may ride for hours in the shade of beautiful trees. Bridle-paths, or trails, traverse them in different directions. Wherever there is moisture from springs or streams, mountain meadows or cienegas are found, and herds of cattle are pastured on these. In spring and summer the grass is abundant and luxuriant. The slopes on the northern side of this valley are less heavily wooded than on the south. On surmounting them the range could be crossed into another valley of less extent and at a higher elevation, about 6,000 feet above the sea, and here would be found Bear Valley Lake, a storage reservoir for irrigation purposes. Its outlet is Bear Creek, which rushes away to a junction with the Santa Ana, and the two, united, sweep on their course to the Orange-groves of southern California, their waters keeping the finest of these in health and productivity. These valleys are among the most important, and are typical, in their general characteristics, of a series which extends from the ocean to the south-eastern slopes of San Jacinto, in a semicircular sweep of more than a hundred miles.

There are no mills for sawing lumber in this immediate vicinity, although there are a few farther westward. There are some mines, but most or all of these are on the desert-side of the range. Here and there a pioneer had acquired title to a bit of arable ground, with an appurtenant water-right, before these lands were set aside as a forest reservation, and some portions had been granted to railroads. All of these vested interests will, of course, have to be protected or adjusted in whatever regulations may be made for preserving these forests, but no intelligent man who has studied the subject at all could hesitate for an instant in his opinion as to the absolute necessity for preserving them. They shelter the sources of the waters upon which depend the prosperity of all of southern California. The orchards which they keep alive are worth not less than thirty-five millions of dollars, which is three times the amount invested in mines in southern California. Irrigation will depend more and more upon storage reservoirs, for the limits of available water-supply under the present system of use are already in sight. If these mountain valleys were denuded of their forests the winter rains would rush down their precipitous slopes in torrents, which would soon overflow the storage reservoirs, and there would be little or no flow of summer waters. Under such conditions Orange-growing in southern California would be a most hazardous occupation, if not impossible.

The deadliest foes to these forests have been not the miners, or even the lumbermen, but the sheep-herders and careless campers in whose wake came devastating forest fires. The sheep have now been driven away and the campers have seemingly been educated or frightened into greater care. It is certain that forest fires have been less frequent during the past summer than formerly. Appreciable efforts are being made to enforce the laws governing these reserves, and are effecting good results.

A new and important interest which will be useful in preserving these forests is that of the companies now being formed and some of them at work, for establishing plants to generate electricity by the fall of the same waters which furnish irrigation. Some of these plants will each be capable of developing as high as 10,000 horse power, which will be utilized in Los Angeles and at intermediate points for purposes of lighting, manufactures and transportation. These interests will be valuable and will help on the rapid development of southern California. But they, even more than irrigation, will demand a continuous supply of water which must not fall below a certain minimum. This flow must be maintained throughout the long dry summers, and every effort will be made to secure the volume of water and to lessen loss from evaporation by expensive systems of tunnels cut through the

solid rock. These are very fascinating projects, and so feasible that they will doubtless rapidly be pushed to completion. Thus private interests may accomplish more in the end than the fear of the law or Government patrol toward maintaining the integrity of these reservations.

But roads will be needed in order that these plants may be constructed and maintained. By these roads these unique mountain nooks will be rendered accessible to the multitude, and their charm of isolation and primitive grandeur will be at an end. When the multitude comes into the forests the mountaineer, to whom they have been sacred, and by whom they have been loved, will have no other refuge than the desert. Progress, which is the greatest good to the greatest number, is destructive of romance and of the refined pleasures of the few to whom Nature in her lonely and rugged moods is a source of constant pleasure. Comparatively few Californians know their own mountains well. They dwell within sight of them, year after year, ignorant of the beauties which so abundantly repay the slight efforts and sacrifices involved in exploring them.

Redlands, Calif.

William M. Tisdale.

Recent Publications.

Life Histories of American Insects. By Clarence Moores Weed. Illustrated. The Macmillan Company, London and New York. 1897.

In this, his latest book, the author seeks to give in an interesting, readable, untechnical way some account of the transformations and short lives of a few of our common or most conspicuous insects, chiefly those to be found in the northern or middle portions of this country. The book is divided into twenty-six chapters, each one of which treats of some particular species of insect, or a species and its nearest allies, the last two chapters being devoted to true spiders and so-called "harvest spiders." No attempt is made to give a complete history of any species, nor is any claim made to entire originality, although many of the observations are no doubt the result of Professor Weed's own careful studies. In a pleasing, brief, instructive way some of the salient facts in the life history of the insect are touched upon, the end of each short chapter leaving much unsaid that might be told, but giving the reader a desire for more information, and perhaps leading him to the still more pleasant and profitable task of personal investigation. The range of subjects is well chosen to illustrate types or modes of life in the insect world, although wood-borers and some others which come under common observation or speculation are not referred to. A chapter or two each given to water lovers, earth-burrowers, leaf-eaters, leaf-miners, case-bearers, predaceous insects, those which are parasitic, etc., are sufficient to give the tyro a good idea of some of the things he should see in the insect life about him and which too commonly pass unnoticed. It would add greatly to the cause of economic entomology and to the proper understanding of our insect friends and foes if such books as Professor Weed's were more commonly read, for such reading must inevitably lead any thoughtful mind to further study or the desire for it. The chapter on "Sand-wasps and their Victims" must open the eyes of many readers to episodes in insect life occurring commonly about them, facts familiar to entomologists, but scarcely known except by students of that branch of natural science. Much might be quoted here, but such quotations would give but a slight idea of the many interesting observations on insect life presented in an attractive and popular form in this volume.

This book might well be used as a reader in connection with the science-teaching in some of our schools. The pages are abundantly illustrated with original or more familiar figures borrowed from other works; and it is pleasing to add that proper credit is always given to other authors or publishers for any observations or figures which have been borrowed.

Notes.

A market garden at Gretna, Louisiana, managed by a Chinese company, is briefly described in *The Rural New-Yorker*. Besides Cow Peas, used on old land, a fluid obtained from decom-

posed fish is depended on to fertilize the soil. In the intensive system of cultivation practiced a cupful of this ill-smelling fluid is poured at the root of each plant. Only the Chinese trade is supplied, and the chief vegetables grown are Pumpkins, Okra, Yams, Cabbage and several members of the Cucumber tribe.

It appears from a note printed in the October issue of *The Kew Bulletin of Miscellaneous Information* that the so-called bandoline wood is derived from *Machilus Thunbergii*, a relative of our Sassafras-tree. The shavings and chips of the wood when soaked in cold water yield a viscid mucilage-like matter which is used by Chinese ladies in bandolining their hair. This tree is a native of southern Japan, Formosa and south-eastern China, and is an exceedingly handsome evergreen with elongated leathery lustrous leaves.

The crop of chestnuts is disappointing in quantity this season owing to dry weather in August, when the nuts should fall out rapidly. Sound chestnuts of ordinary size from near-by northern states sell for twenty cents a pound in this city. This shortage is particularly evident in the lack of offerings by Italian vendors on the sidewalks. Hickory-nuts are abundant, and the best shell-barks sell for ten cents a quart. Black walnuts are not yet in market. Butternuts, from Vermont, sell for twenty-five cents a half-peck in their hulls.

In the first issue of *The Plant World*, a monthly journal of popular botany, Dr. F. H. Knowlton, the editor, calls attention to the existence in a swamp near Laurel, Prince George's County, Maryland, of a form of *Lilium superbum* with stems seven or eight feet tall and clear lemon-yellow flowers without spots, but with large bright green triangular markings at the base of the perianth-segments. The leaves are described as similar to those of the common form, although perhaps more scattered, and the flowers are similar in size and shape. Although not abundant, it appears that this plant has been known locally for many years and that a few specimens can be found every year.

A writer in the October issue of *Forest Leaves* describes two White Pine-trees on the farm of Miss Gallagher, in Allegheny township, Cambria County, Pennsylvania, which are believed to be the two largest trees in the state. The trunk of one of these trees is oval shaped, the longer diameter being over eleven feet and the shorter nearly seven feet. About twenty feet from the ground the trunk divides into a dozen branches, the principal one being about thirty inches in diameter and ninety feet high. The smaller tree is seven feet in diameter. A finger-board which formerly stood on the road from Cresson to Loretto at a side road two miles from Cresson bore the legend "This way to the Big Trees."

From a recent number of the *Pharmaceutical Journal* it appears that in November, 1895, an ordinance was promulgated in Corea legalizing the export of Ginseng. For centuries red Ginseng has been sent to Peking by the overland embassy, the trade being a royal monopoly from which the King of Corea derived the principal portion of his revenue, the export by sea being prohibited. The annual crop is limited in quantity to about 15,000 catties, upon which an excise duty of \$10 a catty is charged under the new regulations, to which is added an import duty of five per cent ad valorem, levied on its arrival at a treaty port in China. Under the new law the King is compensated for his loss of the Ginseng monopoly by an equivalent addition to the privy purse.

In his enthusiasm over the beauty of the form of *Apera arundinacea*, in last week's issue of GARDEN AND FOREST, Mr. Watson did not fully describe the coloring of this handsome Pheasant Grass. The common name is aptly given for its browns and reddish browns, distinctive of the attractive bird, and perhaps no other Grass is so quaintly and highly colored. T. Smith, of Newry, Ireland, introduced this species some years ago, but it seems to have only lately attracted attention. It is one of the handsomest Grasses. While hardy, it seems to require care in removal or transplanting, and springtime appears to be the proper season for planting out. Like all the noble Grasses, this should be grown as an isolated specimen, or, at least, separate from other Grasses.

A writer in a recent number of *La Semaine Horticole* estimates the possible length of life of a number of European trees, basing his calculations on many measurements. Such estimates are, of course, interesting, although the length of life of any tree depends so much on conditions of soil and on immunity from accidents that they must be taken with many allowances. The following are his estimates: Judas-tree (*Cercis Siliquastrum*), 300 years; Elm (*Ulmus campestris*), 335; Ivy (*Hedera helix*), 450; Field Maple (*Acer campestre*),

516; Birch (*Betula alba*), 576; Orange (*Citrus Aurantium*), 630; Cypress (*Cupressus sempervirens*), 800; Walnut (*Juglans regia*), 900; Plane (*Platanus orientalis*), 1,000; Linden, 1,100; Norway Spruce, 1,200; Oak (*Quercus Robur*), 1,500; Cedar of Lebanon (*Cedrus Libani*), 2,000; and Yew (*Taxus baccata*), 3,200 years, while to our Southern or Bald Cypress (*Taxodium*) a length of life of 3,000 years is ascribed.

One of the most delightful American trees in autumn is certainly the Sassafras when it becomes conspicuous in the landscape by the varied tints of the delicate orange coloring of its leaves, and this year it has been unusually beautiful. But it is not in autumn alone that the Sassafras is attractive and interesting; in winter its bright green, lustrous branches make a cheerful note on the margin of the forest; in spring it is charming, with its drooping clusters of delicate yellow flowers surrounded by the enlarged and showy scales of the expanding buds; all summer long its variously shaped fragrant leaves retain their healthy luxuriance; and the fruit, which birds rarely allow to remain long on the branches, is showy, with deep blue berries and much thickened and scarlet cups. Few people plant the Sassafras, perhaps because it is a native tree, and nurserymen rarely offer it for sale. Large plants are difficult to transplant, as the thick, fleshy roots are scantily provided with rootlets, but small plants which can often be found in abundance along fence-rows and wood borders, are easily managed and grow rapidly when set in good soil. With many other common American trees the Sassafras ought to be often planted in American parks and along the margins of American highways.

Of the exotic trees recently introduced into American gardens one of the most promising is the Japanese *Prunus Pseudo-cerasus*, which has for several years proved hardy in the Arnold Arboretum, where it is growing rapidly and has not yet been attacked by insects or fungal diseases. Forms of this tree or of some allied species with double flowers are now rather common garden plants in the United States and Europe, but these are less hardy and of much slower growth than the wild type which appears to be rare in American collections. It is the largest tree of the Rose family in Japan and, next to the Apricot, more cultivated for its flowers by the Japanese than any other tree. In the forests of Yezo, where it is very common and sometimes eighty feet high with a trunk three feet in diameter, it resembles in the appearance of the bark and in habit the wild type of *Prunus Cerasus*, the Cherry-tree of our gardens, and it might be mistaken for that species. In autumn it is particularly beautiful, as the leaves turn deep scarlet and light up the forest before the Maples assume their brightest colors. For centuries this Cherry has been used in Japanese gardens and temple grounds, and near Tōkyō there is a Cherry avenue more than a mile in length along the banks of the Sumi-da-gawa, and at Koganei ten thousand of these trees were planted a century and a half ago in an avenue several miles long. It is a valuable timber-tree in Japan, and, if it proves unattractive to insects in this country, it may prove useful here in forest as well as in ornamental plantations.

Our London correspondent, Mr. William Watson, publishes in a recent issue of *The Gardeners' Chronicle* some interesting notes on the creeping species of *Ficus* now in cultivation. They are *F. radicans* of gardens, although that name has been given by Roxburgh to another plant; *F. stipulata*, popularly known as *F. repens*, with a smaller-leaved form known as *F. minima*; *F. falcata* and *F. barbata*. *F. radicans* is a useful evergreen for covering walls, pillars, etc., in warm houses. There is a variety variegata with leaves marbled and margined with white. *F. stipulata*, or *repens*, is the plant commonly found in American hot-houses. It is a native of Japan and China, and has been cultivated in Europe for a hundred and twenty-five years. This climbing Fig is hardy in the southern states and in California, and in countries of such temperate climates is one of the most useful of all evergreens for covering walls or the sides of buildings. *F. falcata*, which has recently been introduced into English gardens by Low & Company, is a native of the Malayan Peninsula and Archipelago, where it is not uncommon on trees and rocks. By Dr. King, the author of the classical monograph of the Asiatic species of *Ficus*, it is described as "a very remarkable and beautiful species, varying much in fruit and in the shape of the leaves, even in the same plant, the leaves on its small branchlets from the lower part of the main stem being often much smaller than those from branchlets near the apex, and occasionally different in form." *F. barbata*, which is a native also of Malaya, is a more vigorous plant, with hairy leaves often six inches in length, and is occasionally cultivated in European hot-houses to cover Palm-stems and pillars.

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Autumn Work among the Trees.

NOW is the time at the north to prepare for planting trees next spring, for all planting north of the latitude of this city is most safely done at that time of the year. Further south the long autumn enables trees planted when the leaves are ripe to push out new roots and establish themselves before the ground freezes. Where cold weather follows close after the early frosts a tree planted in the autumn has no opportunity to develop new roots and, therefore, loses not only the benefit it would have obtained in a more temperate climate in an early and vigorous spring growth, but is forced to go through the winter without the aid of roots in actual working condition. Trees planted in cold countries at this season of the year do not necessarily die, but they are more apt to suffer than those planted in the spring; they are often blown over unless carefully staked, and they are frequently upheaved by the frost or thrown out of the ground entirely. For all operations, however, connected with the planting and care of trees, except the mere setting in the ground, the autumn is the best time. At this season planting plans should be made and stock selected, and the ground should be made ready to receive the trees as soon as the frost leaves it in the spring. Spring in this latitude is so short and the rush of spring work is so pressing that it is impossible to properly prepare ground for planting unless it is done during the previous summer or autumn. This is the time, therefore, when northern planters should decide what trees they want to use next spring and where they will plant them; it is the time to select and order nursery stock, and here it may be said that better results are always obtained by personal inspection and selection by the purchaser than by leaving it to the seller to fill his orders. If the planter has facilities for protecting plants through the winter in a cold cellar or pit, it is better to obtain them now than in the spring, when nurserymen are crowded with orders and too busy to devote proper time and attention to digging and packing their trees. The ground being prepared, the exact position of each plant determined on and the plants on hand, the mere operation of setting them in the ground takes but a short time. A man, moreover, who is thus

prepared beforehand for spring planting can take advantage of the first suitable weather and get his trees into the ground as soon as the frost is out and it is dry enough to work, while if he waits for material ordered in the spring it will frequently not be received until after the trees have started to grow and warm dry weather has set in. In a climate like that of our northern states, where summer follows hard after winter and where spring is almost unknown, there is no other operation of the farm or garden which demands more carefully planned preparation than tree-planting.

It is wise economy, too often neglected in this country, to prepare the ground thoroughly before trees are planted. Where isolated specimens are required ample pits should be dug for them, and the larger they are made the better it will be for the health and beauty of the future trees. A hole three feet deep and twenty feet across is not too spacious for a long-lived tree of the first class. Into these excavations the loam taken from them should be returned, together with enough peat or good soil added and thoroughly mixed with it to supply the place of the poor subsoil, hard pan and stones, which should be rejected. If it is proposed to plant trees closely over considerable areas, as is sometimes necessary in large parks, the ground should be thoroughly subsoil-plowed and broken up, the large stones removed and the surface as carefully mellowed and enriched with good stable-manure, as if it was proposed to raise a crop of corn on the land. When the land is prepared in this way the surface can be easily stirred and kept free of weeds by horse power until the trees are large enough to shade the ground.

But the care of growing trees is quite as essential as the planting of new ones. As we have often insisted, time and labor are worse than wasted in planting unless the after care is intelligent, determined and ceaseless. Now is the best time for pruning trees, before work among them is rendered unpleasant and unsafe by extreme weather and before their limbs are coated with ice, and every year all young plantations intended to produce ornamental effects should be looked over; too vigorous or unnecessary branches should be checked and all but single leaders removed, that forks of the main stem which are liable to endanger the trees in the future by splitting may be prevented.

This is the best season, too, for studying plantations and marking for removal all trees which are injuring their more valuable neighbors. No tree can attain its full size or its noblest expression, or hope for a reasonable period of longevity, unless it can obtain its share of air, sunshine and food. Many of our public parks and private gardens are disfigured by trees which are left dwarfed or starved, or forced out of shape by aggressive neighbors. Most planters desire to produce an immediate effect with their work, but planting for immediate effect means overcrowding, and when the young trees begin to struggle with each other for mastery, delay in thinning is fatal, for they will begin at once to spindle up or bend toward the light and will soon be ruined as ornamental trees.

These autumn days can be used to no better purpose, therefore, by one who has trees or hopes to have them than by a thorough study of his ground before the snow covers it; by thorough preparation for getting through spring planting without hurry, and by a resolute and determined use of the axe wherever the thinning of trees is necessary to improve the appearance and insure the permanency of his plantations.

Notes on Cultivated Conifers.—V.

THE genus *Cupressus*, which is distinguished by monœcious terminal flowers and subglobose woody cones with scales abruptly dilated, and flattened and furnished at the apex with short central knobs, is widely scattered over the Atlantic and Pacific coast regions of the United States, Mexico and Lower California, and in the Old World

is distributed from south-eastern Europe and the Levant along the Himalayas to China. The seventeen or eighteen species now recognized can be conveniently grouped into two sections—*Eucupressus*, distinguished by its four-sided branchlets, denticulate leaves, and large fruit maturing at the end of the second season, with numerous seeds in several rows under each scale; and *Chamæcyparis*, distinguished by flattened, often deciduous branchlets, entire leaves, and small fruit maturing at the end of the first season, with from one to four seeds under each scale. The genus has made important contributions to gardens, and nearly all its members are handsome and fast-growing trees. To *Eucupressus* belong the Monterey Cypress (*C. macrocarpa*), one of the most picturesque trees of the American forests and the most universally planted conifer in our Pacific states, *C. sempervirens*, in its fastigiate form, a chief ornament of gardens in the countries bordering the Mediterranean, the so-called Cedar of Goa (*C. Lusitanica*), a native of India and for more than two hundred and fifty years an inhabitant of Portugal, where it has become naturalized, and the Funeral Cypress of the Chinese (*C. funebris*), a frequent inhabitant of temple gardens and a living monument over many Chinese graves. No *Eucupressus*, however, is hardy in our northern gardens, and in these notes only species of *Chamæcyparis* need be considered. These all grow comparatively near the sea in Atlantic and Pacific North America and in Japan, only five species being known.

The type of this section, *Cupressus thyoides*, is the familiar White Cedar of the eastern states, where it grows in cold swamps on the Atlantic and Gulf coast plain, usually immersed during several months of the year from southern Maine to northern Florida and the valley of Pearl River, Mississippi, covering them at the north with pure forests of wide extent, and at the south mingling with the Bald Cypress and other moisture-loving species. It is a slender pyramidal fragrant tree often seventy or eighty feet tall, with a stem rarely more than two feet in diameter, thin, spreading branches clothed with open flat fan-shaped spray, and dark, dull blue-green foliage, becoming rusty brown at the north in winter when exposed to the sun. The White Cedar, which is rarely cultivated in our gardens for the reason, perhaps, that it is a common native tree, is, of course, perfectly hardy; and in thoroughly drained or in undrained soil grows rapidly into a slender, shapely, graceful open pyramid. European nurserymen propagate several forms of this tree with glaucous and with yellow-marked foliage, and others with fastigiate and pendulous branches. *Cupressus thyoides Hoveyii* is a slender form with short ultimate branchlets forming dense terminal tufts. *Cupressus thyoides nana* is a dwarf compact form with glaucous foliage. The small dense pyramidal bush with erectly spreading glaucous leaves, which turn bronze color or purplish brown during the winter, is now usually supposed to be a monstrous form of the White Cedar; its origin, however, is unknown, and by different authors it has been called a *Cupressus*, a *Juniperus*, a *Retinospora*, a *Frenela* and a *Widdringtonia*. This curious little plant, which possesses little beauty, was much used a few years ago in European gardens and is frequently seen in American collections, although it is not always perfectly hardy in the neighborhood of Boston.

Two species of *Chamæcyparis* (*Cupressus Nootkatensis* and *C. Lawsoniana*) inhabit Pacific North America and are among the noblest and most valuable trees of this continent. The more northern of the two, *C. Nootkatensis*, the Sitka or Yellow Cedar, is a common inhabitant of south-eastern Alaska, where it is scattered through the forests of Spruces and Hemlocks which cover the coast mountains, and ranges southward through western British Columbia and Washington to the valley of the Santiam River, in Oregon. It is the most valuable timber-tree of Alaska, where it sometimes grows to the height of one hundred and twenty feet, with a trunk six feet in diameter. Its light, close-grained pale yellow wood has no superior in our

forests as material for the cabinetmaker, and in its lasting quality when put into the ground. The slender branches of the Yellow Cedar, sweeping outward and upward in long curves and furnished with long, gracefully drooping frond-like bright yellow-green branchlets, make this tree lovely in its native forests; but to develop all its beauties it requires the humid climate of the north-west coast, and in drier regions displays little of the grace and vigor which make it one of the handsomest of our conifers. In gardens, both in the United States and Europe, the Yellow Cedar is usually known as *Thuopsis borealis*, and is still generally seen only in juvenile form with dense pyramidal habit and blue-green foliage. It appears to be quite hardy from New York southward, but east of Cape Cod, although it can often be kept alive for some time, it usually succumbs at the end of a few years to the hardships of its surroundings, and is never really satisfactory in this part of the country. *Cupressus Nootkatensis* is no exception to the rule, that the plants of this group show a marked tendency to seminal variation, and European nurserymen propagate a number of more or less well-marked forms with variegated and glaucous foliage and with pendulous or abbreviated branches. None of them, however, has much morphological interest or horticultural value.

The largest of all the Cypress tribe and one of the great timber-trees of the world, *Cupressus Lawsoniana*, is now a familiar ornament in the parks and gardens of all temperate countries, although it is less than fifty years since its discovery. Its great size, for specimens two hundred feet in height, with trunks ten or twelve feet in diameter, are not rare, the remarkable thickness of its deeply lobed bark, surpassing in this all other members of the Cypress tribe, its graceful beauty in youth, with its delicate feathery branches and drooping leading shoots, and the nobility of its port at maturity, give exceptional interest to this tree. Restricted in distribution to a narrow strip of the southern Oregon and northern California coast, with outlying stations on the headwaters of the Sacramento River, Lawson's Cypress has shown itself capable of supporting very different conditions from those in which it flourishes naturally; and from New York southward it may be seen in a fairly vigorous condition, although it never, perhaps, grows as luxuriantly in the Atlantic states as in western Europe. In New England, unfortunately, it merely survives in sheltered positions, and we shall have to give up the idea of using this tree here in general planting. The tendency of Lawson's Cypress to seminal variation is remarkable, and more than sixty varieties have been named by European nurserymen. One of the most distinct of them, *Cupressus Lawsoniana erecta viridis*, is a strictly pyramidal plant with bright green foliage, which appeared many years ago in the Knapp Hill Nursery, at Woking, in England, and is one of the best of the pyramidal conifers. Other seminal forms are distinguished by pendulous branches, by dwarf habit and by more or less variegated or abnormally colored foliage, but in many of these varieties the divergence from the type is so slight that their names are not worth preserving. Named in honor of Sir Charles Lawson, of Edinburgh, the distinguished rural economist and for many years the head of the nursery firm of Peter Lawson & Son, this tree is universally known in the forests of Oregon and the lumber-yards of San Francisco as the Port Orford Cedar, from the harbor on the Oregon coast, where the lumber is largely shipped to San Francisco. The wood is light, hard and strong, and abounds in a fragrant resin, which makes it exceedingly durable. For many years it has been used in large quantities in California for the interior finish of houses and in boat-building, and from this wood the matches used on the Pacific coast are made.

The *Retinosporas* now familiar to the cultivators of coniferous plants all belong to this section of *Cupressus*, and are all forms of two Japanese trees, *Cupressus obtusa* and *C. picifera*, although some of them appear so distinct that it is sometimes hard to realize until the appearance of a normal branch discloses the secret of their origin, that they

are merely monstrosities that have been cherished and propagated, perhaps, for centuries by the Japanese.

Cupressus obtusa, the Hi-no-ki of Japan, is a native of the southern mountain provinces and the most valuable timber-tree of the empire. Sacred to the disciples of the Shinto faith, it is planted in the neighborhood of all Shinto temples, which are built of its wood. It is also cultivated for its timber in the mountain forests of central Japan, where it often attains the height of 100 feet, with a tall straight trunk three feet in diameter near the ground and free of branches for fifty or sixty feet. The wood is light, strong, tough and very durable in contact with the soil, pleasantly fragrant like that of the other species of this section, and white, straw-color or pink. The palaces of the Mikado in Kiôtô were made from the wood of this tree, which also serves for the frames of Buddhist temples and the interior finish of expensive houses. In Japan *Cupressus obtusa* is one of the favorite subjects for dwarfing, and is often cut into eccentric shapes, and several abnormal varieties or juvenile forms are cultivated. *Cupressus obtusa aurea gracilis* is a free-growing and beautiful form of this tree introduced into our gardens a few years ago by the Veitchs; and there are dwarf bushy forms in cultivation in this country and Europe, some with leaves of normal color and others with yellow foliage. These are highly prized in Japan, and can be seen in almost every Japanese garden. A distinct form known as *Retinospora lycopodioides* has stout erect branchlets densely clothed with bluntly awl-shaped, very dark green leaves, and another, *Retinospora filicoides*, is peculiar in its long, slender, spreading branches covered with short, broad, light green sprays of quadrangular branchlets.

Cupressus picifera, the Sawara of the Japanese, is planted in their forests and temple-grounds with *Cupressus obtusa*, and produces redder, coarser-grained and less valuable wood. The common Golden *Retinospora*, *Retinospora picifera aurea*, is a form of this tree, and is here, perhaps, the most frequently cultivated of the Japanese *Retinosporas*. A more remarkable form is the so-called *Retinospora squarrosa*, in which all the leaves are disposed in decussate pairs and are short, acicular, pale blue-green and spreading or slightly bend toward the branchlets. This is a low, broad, dense bush or small tree with large divided and forked stems. Almost as remarkable is *Retinospora filifera*, another form of this tree with long, slender, pendulous, thread-like branchlets clothed with subulate, acute, dark green leaves arranged in remote alternate pairs; there is a yellow-colored form of this plant. This is certainly one of the most remarkable of all pendulous-branched conifers, but, unfortunately, it is very capricious, sometimes flourishing with great luxuriance, as in Mr. Hunnewell's pinetum at Wellesley, Massachusetts, but more often perishing from the cold of severe winters.

For the north-eastern states, at least, the introduction of the Japanese *Retinosporas* has proved a doubtful blessing. The most beautiful and valuable of them, *Cupressus obtusa*, appears quite hardy, and in its early years makes a handsome plant here, but it soon develops a tendency to grow thin, and well-furnished specimens more than twenty feet high are not common. *Cupressus picifera* is a more rapid-growing, and perhaps a hardier, plant here, but with its loose narrow crown of more upright branches it is less ornamental than the Hi-no-ki. Some of the varieties are morphologically interesting and some of them are handsome; they are uncertain, however, sometimes flourishing for years, and then dying suddenly or gradually becoming thin in foliage and shabby in appearance; and where they do flourish, unless used with caution, they bring too many strange forms and unnatural colors to our plantations.

All the plants of this group can be readily propagated from cuttings, which root easily and grow rapidly; and to bring out all their beauties they require rich well-drained soil, and in this climate partially shaded situations protected from the drying winds of early spring.

In the next numbers of these notes we shall discuss the

horticultural value of the remaining genera of Cupressineæ, *Thuya*, *Thuyopsis* and *Libocedrus* and the Taxodineæ, which give to our gardens *Sciadopitys*, *Sequoia*, *Cryptomeria* and *Taxodium*.
C. S. S.

The St. Croix River.—II.

MAINE AND NEW BRUNSWICK.

NO Oaks are visible near the St. Croix River, though the name Oak Bay indicates that they were once found here; but a few miles inland a rare specimen is now and then seen beside a lonely lake, afar from its kindred and having quite the air of an exotic. They apparently do not sow themselves, for two trees on Boyden's Lake are the only ones I ever saw anywhere near the shores of the river. The fierce winds and driving storms render tree-moving a thankless task, and without great care transplanted Maples and Elms do not thrive, even though natives of the locality, owing to the short summers. Elms planted fifty years ago in the towns of the region are only half as large as they should be after the same length of time in southern Massachusetts. On the other hand, Evergreens flourish, and the White Spruce, which finds lower New England quite too warm for it, grows to majestic proportions, making a good show from the seed in twenty years.

Fields that were quite bare in 1865 are now impenetrable woods in great need of skillful foresting. It is impossible to see the wealth of timber that is likely to go to waste without wishing that there could be some intelligent management of the resources of the country, so that good, well-grown, handsome trees might replace the spindling growths which result from overcrowding. Both the White and Norway Pine abound in this locality, and their commercial value is likely to increase immensely even in a decade, so that if these trees were helped to good smooth growth they might prove of value to their owner more than sufficient to pay the expense of taking suitable care of them. Everywhere, however, one recognizes the danger of fire in the dead underbranches, and in the brushwood rudely cut down along the waysides, and left to dry and ignite from the first cigar stump thrown away by a careless passer-by; for there is no vigilant village improvement society, such as exists at Mount Desert, to use proper preventive measures to avert disasters of this kind.

A lovely feature of the woods along the St. Croix is the prevalence of that exquisite flower, *Linnæa borealis*, whose twin bells greet one with their aromatic fragrance throughout the month of June. This favorite of the great botanist, to which he has given his name, loves the moist mossy shade of the sparse growth along the water's edge, and carpets the ground with its small leaves and perfumed pink flowers. A little later in the season the sheer precipices are hung with Ferns and delicate Harebells, blue and white, which find a secure foothold in clefts and on ledges just out of reach from a boat. Still another ornament of these woods is the Low Cranberry, *Vaccinium Vitis-Idææ*, which makes a foot cloth fit for the dance of Dryads, with its shining dark green leaves rising from a creeping tufted stem, all jeweled with the little red-cheeked berries which nestle among them. In groves that I remember along these salt, wind-swept shores I have often picked up the empty shells of sea urchins, dropped by gulls that fly over the evergreens, which shows how near the trees grow to the home of fishes, and what hard conditions of wind and weather are theirs to struggle with.

The aspect of the St. Croix region is still that of the border settlement. Its navigable length is about thirty miles, and but little of it is occupied. After leaving Eastport, which is a compact little town with houses closely grouped together upon one of the islands of the bay, no village on the American side is visible for eighteen miles. Up the river such dwellings as appear are far apart. St. Andrews, New Brunswick, forms a sort of half-way station, and is the sleepest of provincial towns, feebly galvanized by summer

visitors; yet its situation is very beautiful, with a lofty hill behind it, fine beaches and a breezy invigorating climate. Robbinston, on the American side, once a famous little place for ship-building, has mouldered with the decay of that industry. A few new houses for summer residents, half-buried in trees, are to be seen along the banks of the river, from which there are lovely views, and the walks and drives of the neighborhood are picturesque and interesting.

The active life of the neighborhood settles in the border city, Calais, at the headwaters of the St. Croix. It is connected by a bridge with the New Brunswick city of St. Stephen, and these two are stirring, but slowly-growing places. The two towns together have a population of perhaps fifteen thousand, and besides sawmills at the falls, there is a cotton mill and also a shoe factory. These and other industries bring a rough population, which threatens to replace the more dignified element which first peopled this section of the country.

With a little well-directed and united energy in municipal improvement on the part of its inhabitants Calais might be made a beautiful town, for, owing to the care of the early settlers, the streets were planted with rows of trees which now overshadow them during the summer months. The outlook upon the river is also agreeable. Fences have been removed and many of the grass-plots between the houses and the street are kept neatly mown, but others are sadly neglected. Recently a little park about the Soldiers' Monument, in the centre of the town, has been put in order, and this contains a semicircle of fine old Elms, which make a good background to the armed figure on its pedestal. There is an opportunity for a good open space about the handsome Public Library if some unsightly buildings which disfigure the neighborhood could be removed and the spot they occupy grassed and planted. But the City Council is not endowed with the artistic sense, and the members say the town has only money for what is necessary, and must dispense with ornamental improvements for the present.

It is gratifying to notice among the inhabitants an increasing interest in remedying the long-standing defects of the town, and the efforts of the more tasteful and public-spirited among them will no doubt be imitated as time goes on. The general aspect of the main street is certainly much better than it was ten years ago, and the care of lawns is beginning to be recognized more generally. When the Washington County Railroad is completed, and the inhabitants of eastern Maine no longer have to go through New Brunswick to get home from Boston by land, it is probable that improvements will take a start, and that æsthetic as well as financial progress may be looked for in the Border City.

The natural beauty of the St. Croix should be wisely guarded by those who dwell upon its banks. A stretch of woodland along the river, about three miles below Calais, a small part of which belongs to the city, might be converted into a riverside park of real beauty. The steep banks could be descended by terraced paths so as to reach the beach from the road above, through what is now a tangle of trees and underbrush. There are fine Hemlocks and other evergreens in these groves and plenty of Maples and Canoe Birches, which a little attention would greatly beautify. Vistas opened in the proper places would reveal charming views of the narrows and headlands of the river, and the inhabitants would soon take pride and delight in so valuable a possession if it were only made reasonably accessible. Through the brief summer months the citizens delight in living out-of-doors, and revel in the lovely scenes along the river, which they enjoy from boats and carriages; so some project for a park near at hand might, if skillfully managed, meet with good support, since they have a nucleus to begin with in the piece of woods they own.

Taken as a whole, the St. Croix River is wonderfully beautiful. Its great tides, its broad beaches, its picturesque shores, its red rocks, its sandy coves and bold headlands have a unique character which never fails to impress a stranger,

and they are specially endeared to those to whom they have been from early childhood familiar.

Hingham, Mass.

Mary C. Robbins.

New or Little-known Plants.

Hypericum galioides.

WE have frequently called attention to the beauty of the shrubby North American species of *Hypericum* and their value as garden plants, and several of them have been first figured on the pages of this journal. They all produce clear yellow flowers at midsummer when comparatively few shrubs are in bloom, and they flower profusely.

One of the most beautiful of the group, *Hypericum galioides*, is figured for the first time on page 433 of this issue, from specimens gathered in the Arnold Arboretum, where it has been successfully cultivated for a number of years, and where it makes a handsome compact broad round bush about three feet in height, with slender stems covered with dark green linear-lanceolate, more or less revolute mucronate crowded leaves an inch and a half long and an eighth of an inch wide, and small axillary and terminal flowers which open at the end of July.

Hypericum galioides naturally inhabits wet ground, and is distributed from Delaware to Florida, where broad-leaved forms occur (var. *ambiguum*), and to eastern Tennessee and Georgia.

All the shrubby *Hypericums* can be easily raised from seeds and grow freely in good rich garden soil, and were they better known they would, no doubt, become extremely popular for the decoration of summer gardens.

Foreign Correspondence.

London Letter.

ORCHID BREEDING.—A paper on some curiosities in Orchid breeding was read by Mr. C. C. Hurst, an amateur Orchid grower, at the last meeting of the Royal Horticultural Society. Orchids are now receiving so much attention from the hybridizer, and so many surprising crosses have been obtained, that students of evolution will find abundant material among the hybrids and crosses represented in gardens in the Orchid department alone. Too much importance should not be attached to what are termed bigeneric crosses, generic distinctions, especially in this order, being often of the slightest character. A hundred years hence, no doubt, many of the genera of to-day will be known only as synonyms. An analogous case is that of *Pelargoniums*; these plants received special attention from cultivators at the beginning of the present century, and botanists saw no less than twenty genera in what we now know as one, namely, *Pelargonium*. The genus *Aloe* is made to include three other genera by some botanists. A still more striking instance of the artificiality of generic distinctions is that of the botanist who has lately separated the tuberous *Begonias* into a distinct genus, which he has named *Lemoinea*. Mr. Hurst said that hybrids between two distinct species were generally exactly intermediate in character. There are, however, many exceptions to this statement. "There is often a greater or less divergence toward one parent. . . . Many instances can be cited in which the pollen parent has greatly influenced the character of the flower, and the seed parent the vegetative organs of the progeny. On the other hand, the opposite has occurred." (Veitch.) That the same cross may be repeated, and identical results obtained each time where fixed species are used, depends upon the fixity of the species. Mr. Hurst protests against hybrids from the same parents receiving distinctive specific names, however much variation they may show. A list of the hybrids raised with their parentage reveals some extraordinary crosses and shows how little is indicated of what may be termed the blood relationship of species and even of



Fig. 55.—*Hypericum galioides*.—See page 432.

genera, either in characters of size, form or color, or in our nomenclature. While such crosses as *Odontoglossum* with *Phalænopsis*, or *Cypripedium* with *Dendrobium*, are im-

possible, the fact that *Sophranitis* has bred with *Cattleya* and with *Epidendrum*, proves that wide differences in stature and form are not barriers to interbreeding. A good

hybrid Orchid is now worth more than a new introduction ; in other words, collectors value highly the hybrid of artificial origin, and therefore Orchid breeding has come to be a lucrative business. It has also a scientific interest, if only because it throws light upon the relationship of plants. Mr. Hurst pointed out that it was not unusual for Orchids to produce seed-pods and apparently, also, seeds, but the latter may turn out to be chaff. Monsieur Lemoine, of Nancy, who has bred so many fine garden plants other than Orchids, makes a practice of trying to cross almost every plant that flowers with him, and while these are in most cases "fools' experiments," in some the result is successful. Many Orchid growers in England are now making similar experiments, and there is often a keen competition for the possession of a new Orchid or good variety solely for breeding purposes.

DO ORCHIDS DEGENERATE?—This question is now under discussion in English gardening papers ; that is, do they decline in health under cultivation ? Every cultivator of experience knows that some do and some do not. There are certain Orchids, I think I may say a large number, which never do become established in our collections. They may last a year or two longer in one garden than in another, but they will not "stay" anywhere. We may now and then discover by accident the secret that leads to success with one or the other of these refractory ones ; generally, however, we must look to the collector to keep up the supply by sending home more plants if we are not to lose them. Luckily, however, we have on the other hand a considerable number of Orchids, which, with ordinary care, flourish for an indefinite time. It has been suggested that the failures are cases of starvation, and chemical analysis of the plants is said to indicate this. Chemical manures are recommended, but how far they may be used with safety is doubtful. Experienced cultivators declare that manure in any form for Orchids is to be avoided.

DENDROBIUM TAURINUM, var. AMBOINENSE.—A plant of this gigantic Dendrobe was shown by Messrs. Veitch & Sons at the last meeting of the Royal Horticultural Society. It had somewhat compressed leafless pseudo-bulbs six feet high, bearing elegant curved racemes a foot long, of flowers with yellow sepals, brown-red petals and lips tinged with purple. Each flower is about two inches across, the segments being strap-shaped and more or less spirally twisted, a character which belongs to several other species from the same region. Messrs. Veitch's plant was brought from Amboyna by Burke, who died recently. The type is a native of the Philippines, where it was found by Cuming ; he sent it to Loddiges, of Hackney, who flowered it fifty years ago. "It is found growing on the Mangrove-trees in the swamps skirting the seashore, where, during severe storms, the plants are sometimes washed by the spray. In such places its pseudo-bulbs often attain a height of ten feet, and produce racemes two feet long" (Veitch). At Chelsea it is grown in a hot, moist stove along with *D. Phalænopsis* and other essentially tropical species. I am afraid its size is against its ever becoming popular, even if it could be obtained in quantity, which from all accounts is extremely unlikely.

CRYPTOPHORANTHUS DAYANUS.—One of the most remarkable of the Orchids belonging to the *Masdevallia* group is this, the largest-flowered of the genus to which it belongs. A plant of it was shown this week by Sir Trevor Lawrence, bearing about two dozen flowers, which in shape and marking are suggestive of a frog's head. They are odd-looking, even for an Orchid, and the curiously windowed sepals must be puzzling to naturalists who try to explain the peculiar structure of flowers. Writing of another species, generally known as *Masdevallia fenestrata*, Darwin, in his *Fertilization of Orchids*, says these windows are intended to admit insects for the purpose of fertilization. But one wonders why the flowers only partially open for this purpose and do not, as in the case of their allies, throw their doors (the sepals) wide open. The habit of *C. Dayanus* is like that of a *Restrepia*, but the leaves are larger

and the short-stalked flowers are about an inch long, pale yellow spotted with purple ; the color of the inside as seen through the windows is buff-yellow. The plant is a native of Colombia and has been known in gardens twenty-five years.

LÆLIA PUIMLA.—I noted in my last letter a form of this plant which had received a first-class certificate under the name of Gattton Park variety. A second plant of it has just flowered in the collection of Messrs. Low & Co., which differs only from the first in having the blotch on the front of the labellum of a deeper purple hue. It was imported among a large batch of the type. For some unaccountable reason the Orchid committee gave this second plant a second-class certificate and renamed it Low's variety.

CÆLOGYNE VEITCHII.—A fine example of this plant was shown this week by Messrs. Veitch & Sons ; it bore six pendulous racemes a foot long of numerous white flowers an inch across. The species was first described in 1895 by Mr. Rolfe from a plant flowered in the Veitchian nurseries, which had been sent from New Guinea by Burke. Dried specimens showed that the racemes are sometimes two feet long. The short column, the absence of markings from the lip and the very short, rather obscure basal keels are quite different from any previously known species. The pseudo-bulbs are fusiform, four inches long and the lanceolate leaves six inches long.

VANDA CÆRULEA.—A white-flowered variety of this noble Vanda is not as beautiful as the type, but it possesses the charm of novelty at any rate. Such a plant was shown this week by Mr. J. Rochford. It bore a spike of flowers which in size and form were medium (there is an exceptional range in these two characters in this Vanda), and although not snow-white the sepals and petals were sufficiently colorless to be called white ; the lip was tinged with dull pink. It received a certificate.

VANDA MOOREI.—This is said to be a natural hybrid between *Vanda cœrulea* and *V. Kimballiana*. It was shown in flower this week by Mr. W. J. Moore, of Bradford, an importer of Orchids from the Shan States, where *V. Kimballiana* is a native. The new plant has broader and more markedly channelled leaves than the last-named species, and the flowers are larger, with broader sepals and petals tinged with lilac, the lip being purple. I do not know if *V. cœrulea* and *V. Kimballiana* are found wild together ; if they are, then possibly *V. Moorei* has originated as suggested. Mr. Rolfe thinks there can be little doubt of its hybrid origin so far as can be ascertained from a comparison between it and its supposed parents.

London.

W. Watson.

Cultural Department.

Chrysanthemums.

LADY FITZWIGRAM, a very early white Chrysanthemum of recent introduction, bids fair to become one of the best sorts for decorative purposes, either grown in small pots or for cut flowers. It is dwarf, and, as generally grown in sprays, is quite effective. It does not, however, compare in size and substance with later varieties. *Glory of the Pacific* is a superior early pink, also quite dwarf, and an excellent variety for bush specimens. *Midge*, as its name implies, is also dwarf, and well suited for growing in small pots. The flowers are comparatively large, and as they mature the florets become charmingly irregular in their arrangement. Among early yellow-flowered varieties none are superior to *Marion Henderson*. The color is the purest yellow, and the flower, while loose, is full ; the florets become twisted as they mature.

Gradually the season for larger blooms approaches. Among yellow-flowered varieties *H. L. Sunderbruck* is still without a peer in color and size. *Harry Hurrel* is also a flower of deep tone and is compactly built. Among white flowers *Mrs. H. Robinson* is unrivaled in beauty of form and finish. It is compactly incurved, and has been admitted into the select incurved class by the National Chrysanthemum Society of England. The same honor has been given *Major Bonnafon*, an incurved yellow, but both these varieties, which are of American origin, we know to be of the Japanese type. The yellow sport from *Mrs. H. Robinson*, named *Mrs. O. P. Bas-*

sett, originated with Bassett & Washburn, of Chicago. It is one of the best novelties of the season, equal in every way to its parent, from which it differs only in color. In general appearance Philadelphia probably comes nearest to it, but this variety has proved an uncertain grower, and, besides, is subject to a leaf disease which appears to be hereditary.

Evangeline is another new variety which may be regarded as an acquisition, especially when among scores of new varieties it is the only one of its color worth growing again. It is said to be the white Kiota, which term gives some idea of its form; but I should rather describe it as a white Eugène Dailledouze. Its habit is superb. Symphonia is a compactly built pink of good color. In Defender we have a fine new maroon. This color, in which the flowers do not "burn," is rare. As far as I have seen this variety is free from that defect. John Shrimpton is the best of the older varieties of its color, and better than California, William Seward or G. W. Childs, all of which are liable to "burn." President McKinley will be valuable among crimson and old-gold varieties. The hitherto best-known varieties of this color, Robert McInnes and Edwin Molyneux, have proved difficult to manage. President McKinley is robust, with excellent flowers and the foliage well up to the flower on a terminal bud.

Mermaid is still considered a good pink for exhibition purposes, where large blooms are desirable. Madame Galbraith, a new French white flower, will also prove a favorite for exhibition. It is elegant in build, the lower florets interlacing the stem as the centre builds up. C. H. Molin is an attractive bronzy yellow of exquisite form. It is of the Japanese reflexed type. The long flat florets recurve about the stem as the centre expands until the flowers become perfectly oval. J. W. Richardson promises to be a good commercial yellow, of medium height and splendid habit. L. Ermindra is a lovely saffron flower. There are few Chrysanthemums of this color, and this is the best. It makes an imposing specimen plant. Castleton promises to be a splendid white flower for exhibition. It partakes of the character of the old Robert Bottomly, but makes a full flower.

Wellesley, Mass.

T. D. Hatfield.

Decorative House-plants.

AMONG the pleasant features of modern house furnishing is the general use of so-called decorative plants, which add a touch of natural grace and beauty to even the most artistic fittings. Enthusiasts have always been able to grow plants in the house successfully under adverse circumstances, but the average householder has neither time nor skill to cultivate a collection of plants under the trying conditions in modern furnace-heated houses. Florists, under stress of competition, have produced great numbers of highly decorative plants at moderate prices, and plant furnishing has become so popular that now the average house contains as many Palms, etc., as bicycles. The list of these desirable plants is short. Four or five species of Palms, Pandanus, Araucarias, India-rubber plant, Aspidistra and Ferns cover the usual list of staple plants from which to select for permanent effects or a ground-work, to which other plants may be added as they are available. As plants become endeared to us, like friends, from long association, it is well to select those rather under the full size desired, and thus secure the pleasure of growing them on.

Any of the Palms ordinarily grown are of the easiest possible cultivation, though they may not be able to survive the attention of careless domestics. If Palms are bought in the spring they should be plunged out in a sheltered border where they are not too much exposed to the wind and can have the sunshine for an hour or two daily. Under this treatment they will have hard foliage capable of enduring the winter with little detriment. Palms bought in the autumn, especially if small, have often passed the summer in the florist's forcing-box frames, and are apt to halt in growth in a living room; they should be hardened off by keeping them in a moderately cool and airy place for a while. The Arecas, Livistonas, Chamærops, Kentias—the ordinary list of Palms—may be grown in glazed pots, but it is less risk to cultivate them in earthen porous pots, which may be concealed in fancy jardinières or vases. Any good open soil suits a Palm, which, while not growing rapidly, requires liberal, but not abundant, supplies of water. Palms also benefit by a fair amount of sun in winter.

Palms in the greenhouse are subject to scale insects. When in that condition I loan mine to the house, finding that the weekly cleaning of the foliage causes the vermin to disappear. This cleaning of the foliage is important if the plants are to be kept in health. Nature usually produces a Palm with a single stem, but probably in answer to a demand, the florists now, by

planting two or three together, secure a "well-furnished" plant, which effectually disguises the stem and character of the species. Pandanus Veitchii (variegated) and P. utilis are both capital house-plants, though, owing to the serrated edges of the leaves they are cruel plants to clean. They will endure many unfriendly circumstances, but not water between the leaves, and they should be watered only below.

Ferns are usually the plants most trying to the housekeeper, as they are generally the shortest-lived and the most expensive part of the plant outfit. The reason is not far to seek. The evergreen Ferns used for home-plants are mostly tender perennials, naturally growing in shade and moisture. Moist surroundings, of course, check respiration, and if the plant is moved to a dry atmosphere it respire faster than the roots can supply the moisture. To add to the trouble the small plants used for filling the table ferneries are often grown in small pots which become filled with matted roots, and if plunged in this condition in the pans the roots are so much less fitted for active work. These small ferneries should be filled with sandy leaf-mold, the roots of the Ferns carefully spread and the pans, after planting, kept in a cool, airy place, exposed to good light, but not sunlight, until the roots are active and the plants hardened. Ferneries so prepared will survive ordinary conditions of the house for months. It is well, however, if we have the facilities of a greenhouse, to prepare several spare pans for each fernery, in which fresh plants may be established to replace the ones in use when these show signs of suffering.

Elizabeth, N. J.

J. N. Gerard.

The Cultivation of Mushrooms.

THIS is an ideal time for preparing to make Mushroom beds, and if there is enough fresh material at hand for the purpose and a place where it may be laid out for a few days to air and sweeten, there will be no trouble now from flies, which give great annoyance earlier in the year, both before and after the beds are made. Our Mushroom beds have always been made up under the greenhouse benches, and those started early in the fall have always brought out a crop of flies that were hard to dispose of and very troublesome while they lasted.

The difficulty experienced in drying the material sufficiently before making up the beds so that the heat will not exceed one hundred degrees, has always caused us much labor. Sometimes a bed has had to be dug up after it was made firm so as to release the heat. We are now careful to have such absorbents at hand as a few loads of dry loam; this is mixed with the fresh manure and turned a few times, and there is then no great heat generated to dispel the ammonia necessary for the sustenance of the crop. The beds are thus easily made firm, there is no danger of overheating, and the heat being preserved instead of dispelled it lasts much longer in the beds. The crop is correspondingly better and of longer duration. We use about one-third loam and two-thirds manure. Some growers use one-half well-decayed manure and the other half fresh, and this seems to give good satisfaction.

After making up the beds the thermometer must be plunged well down and watched for a few days, and if there is no greater heat than ninety-five degrees it is safe to spawn. A greater heat than this will kill the spawn. At the end of a week if the heat does not rise the beds may be soiled over and made firm with the back of the spade. If the heat goes below seventy degrees a layer of hay about eight inches deep should be put over the beds. The warmth will at once be drawn to the surface near the spawn, and after this the heat may be regulated by adding to or taking off the covering.

There is always uncertainty about Mushroom-spawn even to a practiced grower. One has to rely implicitly on what the dealer sends, and it is exasperating to find, after much care and labor, that the spawn is of poor quality. It is curious, too, that it is always the spawn that is at fault. If it has white threads visible on the outsides of the bricks the mycelium has started one stage forward. As this process should take place in the beds themselves, the prospects for a good crop are reduced before planting. But with good fresh spawn, such as is imported by reliable firms in ton lots, there is little danger of failure if proper attention is given to the conditions. We have had great success with the cultivation of Mushrooms under the benches in a Carnation-house. In six years we have never had a total loss of crop, though some crops have been much better than others. A warm cellar would be a much better place and furnish better atmospheric conditions. But in the absence of a cellar one need not hesitate to try Mushrooms in the greenhouse at this season.

South Lancaster, Mass.

E. O. Orpet.

Correspondence.

Trees and Shrubs for Winter Effects.

To the Editor of GARDEN AND FOREST:

Sir,—The autumn tints in foliage have been unusually rich on the Sugar Maples this season, and Dogwoods and Sumachs were also exceptionally brilliant. The absence of boisterous winds until recently helped to prolong the season of autumn colors. The leaves of the Japanese Maple (*Acer palmatum*) keep bright a long time before they fall, and Oak-leaves will continue showy until severe frost turns their rich vermilion tones to rusty brown. The dry leaves of the White Oaks persist until spring, when the swelling buds loosen their hold, and it is not until May that the last can be gathered from the lawn. The rustle of these dry leaves in midwinter is harsh and mournful, and their melancholy plaint seems to intensify the blizzard's force.

Winter effects in the garden do not generally receive the attention they deserve. Willows with yellow bark, the crimson bark of Dogwoods and the green of *Acer Negundo*, rough-coated Cork Elms and smooth Maples, some gray and some red, lend variety and beauty. Among shrubs we have Roses with red twigs and compact brown bushes of *Spiræa Thunbergii*. Evergreens, coniferous trees and shrubs show an endless variety of color and form. The pyramidal European Larch, as well as its American and Japanese relatives of more spreading habit, even though deciduous, are not without beauty. There are coal-black Yews and golden Yews. *Retinosporas* of bluish and of golden tints; graceful Hemlocks and rigid Spruces. The Douglas Spruce is of a rich bronze-green; *Picea orientalis* is almost black; *P. polita*, brown; *P. pungens*, glaucous, besides the many beautiful forms of *Abies concolor* from the western states, such as *A. concolor violacea* and *A. concolor Veitchii*. And these are but a few of the Spruces and Firs.

The climate of no other country is, perhaps, so well adapted for berry-bearing trees and shrubs, and our sunny autumn weather is most favorable for the thorough maturing of the fruit. While in most cases this will ripen and fall, in many instances it remains throughout the entire winter, providing the birds do not pick it. It is not unusual to see the red berries, or drupels, of *Berberis Thunbergii* showing through the new growth in spring. The same may be said of *B. Sieboldii*, a strong-growing species, recently introduced from Japan, on which the fruit hangs in drooping panicles. Both these *Berberis* have attractive autumn-tinted foliage. The Hawthorns (*Crataegus*) are not without charms in midwinter. The fruit, especially on some of our native species, is large and handsome, and would remain for the greater part of the winter if not eaten by birds. It is an old saying in England that a full crop of haws means a severe winter. Probably the most beautiful of these plants is *C. Pyracantha Lelandi*. It is a low-growing, straggling, evergreen bush, unlike other Thorns, and was once placed in a genus, *Pyracantha*. Its scarlet berries are very showy, and as it fruits freely and is of slow growth, it is a first-class plant for the foreground of the shrubbery.

Elæagnus argentea, or Silver Thorn, is pleasing when the summer breeze flutters the silvery leaves and in autumn when the trees are loaded with fruit. In the Arnold Arboretum, among thousands of seedlings, there is one more beautiful than any of the others. It is a plant of *E. umbellata*. This Mr. Dawson will propagate by grafting as a sure means of perpetuating the variety. Another reason for this method of propagating is that the species is unisexual, and probably more than half of the plants grown from seeds would be males, and it is doubtful if the fruit-bearing plants would be as fine as this particular specimen. *E. longipes* has recently come into favor on account of its mild acid fruit, which many persons consider palatable; it is a summer-fruited species, and its season is soon past.

Many wild Roses have showy hips; these are large and orange-red in *Rosa rugosa* and *R. rubiginosa*, the Sweetbrier; red in *R. lucida* and *R. Caroliniana*. The fruit of shrubby Honeysuckles is attractive for a short season in the autumn. *Lonicera Morrowi*, noted last spring as one of the most attractive species when in bloom (see GARDEN AND FOREST, vol. x., p. 227), has now new charm in its decoration of amber-colored berries. All the forms of *L. Tartarica* are interesting in their fruits. Both the American and European Spindle-trees (*Euonymus*) are ornamental when covered with panicles of scarlet fruit. Black Alder (*Ilex verticillata*) grows naturally in low ground, and though a common shrub, it is worth a place for its scarlet fruits alone. The round red berries cluster about the upper parts of the twigs, and stay on nearly all win-

ter. Like the *Elæagnus*, it is unisexual. *Myrica Caroliniensis*, the Candleberry, forms a dense shrubbery, and is a capital bush for planting on gravelly banks. The white resinous matter surrounding the seeds, which accounts for its name, makes an excellent polish for furniture, and is, moreover, pleasantly fragrant. *Symplocos cratægoides*, a recent introduction from Japan, is unique in the color of its fruit, being a rich indigo-blue, with a bloom like that on grapes.

Clusters of shining black fruit tip the branches on Privet-bushes. The fruit itself cannot be called handsome, but the plant is worth a place because it adds variety. One plant of the dwarf, spreading *Ligustrum media* in the Arnold Arboretum will be selected out of thousands for propagating on account of its fine fruit. Privets are among our best flowering shrubs in spring, and a large bank of these plants is a feature of one of the parkways in the Arboretum. The flowers have a sweet perfume. Within the past fortnight a thrifty bush of *Symphoricarpos mollis* in the Arboretum was literally weighted down with large bunches of white fruit. Snowberries are old garden plants and this is one of the best species. The American Mountain Ash, *Pyrus Americana*, is one of the showiest of all trees, with its clusters of scarlet-red fruits.

Gerbera Jamesoni is flowering in Professor Sargent's garden at Brookline for the first time in this country. It is a south African plant, herbaceous in habit; it suggests a scarlet Dandelion, but is undoubtedly distinct and will be a valuable addition for winter blooming. The flowers last a long time. *G. Jamesoni* suggests the esteem in which the Dandelion would be held if it were not a common weed.

Wellesley, Mass.

T. D. Hatfield.

Plum-fruit Rot.

To the Editor of GARDEN AND FOREST:

Sir,—The plum crop in the neighborhood of Boston was nearly destroyed during the past season by a fungus which attacked the fruit as it was beginning to ripen. Can you suggest any method by which the ravages of this pest can be checked?

Newton, Mass.

H.

The loss in Plum orchards during the season just ended was caused by unusual attacks of the gray-mould fungus (*Monilia fructigena*). It is easily distinguished from all other fungal troubles of the Plum by its appearing, as a rule, upon the fruit as it begins to ripen. It grows with remarkable rapidity, causing the plums to decay and coating the fruit with a gray mould as smooth to the touch as powdered soapstone. In this spore-bearing condition the plums shrivel, and may remain as mummified fruit upon the trees for months.

The same fungus attacks the stone fruits generally, and often does as much damage to ripening cherries as to plums. It is one of the serious enemies of the Peach, attacking it earlier in the development of the fruit than in the case of the Plum or Cherry. There is probably a better opportunity for the spores to find lodgment upon the fuzzy coat of the young peach, and the adhering moisture helps them to germinate. The skin is less dense, also, and this favors the fungus upon the peach and retards its early development upon the plum and cherry.

Monilia fructigena is by no means confined to fruit, but may attack buds, leaves and flowers. It also spreads down the twig, causing it to die and the leaves to turn brown and hang lifeless in their places. Many experiments have been made to check the ravages of this fungus; and with peaches they have been fairly successful. Professor Chester, of Delaware, for example, has fought this pest to good purpose with the standard fungicides. The sprayings should be made with thoroughness and at frequent intervals if there is a rainy season like the past one. The showers not only wash off the Bordeaux mixture or other fungicide, but furnish the best conditions for the growth of the enemy.

In addition to spraying, orchardists, if they wish to reduce the *Monilia* to a minimum, should see that all mummy fruits are removed from the trees and the soil beneath them, and burned. The dead branches and the leaves should also be removed from the trees and burned in early autumn, or, better still, as soon as found.

As a cultural precaution orchardists would do well to

pay more attention to thinning their fruit and to giving more space about the trees for the free circulation of air. With plenty of room about the trees and for the individual fruits upon the branches, the judicious spraying and removal of all mouldy fruits and dead twigs a grower may reasonably expect to be comparatively free from this pest, provided his neighbors take the same precautions and the season is not excessively wet and cloudy.

Experiment Station, New Brunswick, N. J.

Byron D. Halsted.

The Forest.

Natural Reforestation on the Mountains of Northern Colorado.—I.

THE traveler through the mountain region of northern Colorado, even though he make only casual observations, cannot fail to be impressed with the extent of the devastation that has been wrought by forest fires. One may ride for miles through regions where the destruction came in very recent years, as is shown by the blackness, the entire absence of living vegetation and the utter desolation. On other areas the general appearance marks the destruction as more remote; many trees are rotting on the ground; from those standing the bark has been worn away, and their bleaching trunks remain, white and ghostly, the last relics of a once grand forest. On these areas other vegetation has started, and some are sufficiently covered with Grasses and Sedges to afford good pasturage for stock. Here and there are thick groves of young Aspens, bordered with scattering shrubs, Elder, Buffalo-berry, Shad-bush, Currants and Gooseberries, or the whole may be covered with a growth of shrubs intermingled with scattering Pines and Spruces. Sometimes this new coniferous growth is scanty, and again it is abundant, covering the whole surface and forming dense forests. Other areas must have been denuded at a still earlier period, and here the evidence of a former forest growth is reduced to a few rotten remnants of stumps or trees. Some of these areas are now timbered with new coniferous growth, others are nearly barren of vegetation.

In addition to these districts that bear evidences of having been at some time denuded of forest growth by fires, there are at middle elevations (7,000 to 8,000 feet) areas of considerable extent that do not now show any signs of ever having been timbered. They are the rounded tops of low mountains, or the exposed plateau-like terraces that lie between them. These are usually rocky, or at least gravelly, and may be entirely bare of timber or sparsely covered with the Yellow Pine. By far the greater portion of the injury to forests has been done in the middle-altitude region (from 7,000 to 9,000 feet), although the effects of fire can be traced in places from the foot-hills at 6,000 feet nearly or quite to timber-line. The forest areas yet remaining intact are mainly those of the subalpine belt, from 9,500 feet up to timber-line. Their escape from destruction is due in great part to the prevailing moist condition of the high zone. The winter snow body is usually heavy, and so slowly does it yield to the summer sun that the saturated condition of the soil holds through the season, and it rarely happens that conditions exist favorable to the spread of fires. The snowfall is commonly less at from 9,500 feet and downward, and it disappears early in the summer, and there follows a period favorable to the spread of fire.

Estimates of the areas that have been devastated in this region are very unsatisfactory. The abrupt and broken contours of the region, the irregularity in the forest bodies and in the burned districts make it exceedingly difficult to form an accurate opinion. Such estimates as I know of are crude approximations, and I may as well pass the question with the general statement that the area is very great.

During the last eight years several trips have been made

through the mountains of Larimer County to the crest of the Front Range, or over the Medicine Bow Range and on across the continental divide west of North Park, and I have noted with much interest the progress of growth in Nature's effort to reclothe the denuded areas. The observations have suggested numerous interesting questions which in the main are unanswerable because of the entire absence of records, or of reliable information as to the time when certain areas were burned. It would be interesting to know with some degree of exactness the time required to start a new forest growth on a burned area, but recorded observations are wanting. Some areas may and do remain bare for long periods, while others will develop new growth within a comparatively few years. The time may thus vary greatly, because growth is so dependent upon local surroundings. Denuded areas in the subalpine region, where the rainfall is commonly greater than below, show the influence of the abundant moisture in the quantity and vigor of the herbaceous vegetation which first follows a fire, but observation leads me to the conclusion that in the higher altitudes the forest trees are much slower in starting, and that they start in less numbers and develop much more slowly than in the lower regions.

That several years commonly elapse between the burning and the starting of new coniferous growth seems indicated by the two following observations, the first in the Cañon of the Cache la Poudre, on a tract that was burned, according to reliable authority, in the summer of 1881. As examined in 1894, thirteen years after burning, grasses were abundant among the dead logs, there were a few shrubs, and a scattering growth of Pines (*Pinus contorta*, var. *Murrayana*), the largest of which was twenty inches high and seven years old. Here it was apparently six years after the fire that the first Pine-tree started. The other observation was made on a tract extending south and west from Chambers Lake, which was burned over in July, 1890. I passed through the burned district a month after the fire, and was greatly impressed with the absolute desolation. No green thing remained; the ground, and everything upon it, was clad in somber black; animal life was absent, and there was something so oppressive in the desolate solitude that I was glad to reach green timber again. A second visit to this tract was made four years later, in July, 1894, and it was with a feeling of keen disappointment that I noted how slight a change four years had wrought. The intense blackness had been subdued in some degree by the action of the elements; some trees had fallen and others were losing their bark, but the general appearance of desolation remained. A very few straggling plants of Grasses and Sedges were the only evidences of returning vegetation.

Colorado Agricultural College.

Charles S. Crandall.

Recent Publications.

Flowers and their Friends. By Margaret Warner Morley. Boston: Ginn & Co. 1897.

We recently spoke favorably of this author's book entitled *A Few Familiar Flowers*, and the present volume, which is addressed to children, and young children, too, apparently, confirms the impression then made that the author knows how to write about scientific subjects in a way to attract those who are addressed. To give children some notion of the ecology, physiology and histology of plants as understood to-day is no easy task, and we can forgive the pursuance of some rather cheap methods if the end is really attained, as it has been, we believe, in this case. Whether in teaching children it is necessary to intersperse so much loquacity we will not consider; but we are sure that some of it might have been omitted in this book with advantage. The teaching itself, so far as we have seen, is correct and modern, and the subjects in some cases so well presented that parents as well as children may find profit in the instruction.

Notes.

* Six medals were recently awarded to Ellwanger & Barry, Rochester, New York, by the Gartenbau Ausstellung, in progress at Hamburg, Germany, for exhibits of fruits. Two of these medals are gold, two are silver and two bronze.

The American Forestry Association invites competitive designs for a corporate seal, these to be submitted to a jury of artists who are named in the announcement. Specifications as to size and other details are also given, and all designs must be entered not later than January 5th, 1898. Mr. George P. Whittlesey, Atlantic Building, Washington, District of Columbia, may be addressed for further particulars.

An exhibition of foliage and flowering plants and cut flowers is announced for November 12th and 13th at the Hotel Astoria, in this city. The exhibition will be managed by the New York Gardeners' Society, under the patronage of ladies prominent in social life and active in philanthropic work. The proceeds will be applied to charity. Exhibits include classes for private gardeners and classes open to all, and prizes will be awarded. J. H. Troy, 365 Fifth Avenue, is the general manager, to whom all communications should be addressed.

A State Forestry Society was organized at Raleigh, North Carolina, on October 21st, with fifteen members. The society elected Mr. W. E. Petty, Carthage, President; Dr. C. A. Schenck, Biltmore, Vice-President; Professor W. W. Ashe, of the North Carolina Geological Survey, Secretary and Treasurer. The main object of the society is to lessen forest fires in North Carolina, which are doing great injury to Pine lands, especially in the south-eastern part of the state, in the valley of the lower Cape Fear River. Methods of improving the condition of lumbered and deteriorated woodland will also be considered, and the re-establishment of waste and eroded agricultural lands in timber.

Of all the Viburnums hardy in northern gardens Viburnum molle retains longest the summer green of its leaves, and this year it is as green and fresh at the Arnold Arboretum in the last week of October as it was at midsummer, although some of the other species have lost their leaves entirely, and the autumn beauty of many others is rapidly passing. The Japanese Viburnum tomentosum, however, is still handsome with leaves partly green or entirely dull bronze-red, and Viburnum Lentago is yet splendid in its deep red coloring. Viburnum molle, which is still little known in gardens, is a southern plant just reaching the shores of Cape Cod, but it is as hardy as any of the more northern species in the neighborhood of Boston. It is a large shapely shrub with ample leaves; the flowers open later than those of the other Viburnums, and are followed by beautiful blue fruits which retain their bright color until very late in the autumn. Altogether this is one of the most desirable garden plants in a group which has given to northern gardens some of its best ornaments.

Pomegranates, from Spain, have been shown in the fancy-fruit stores during the past two weeks, and find a moderate demand at sixty cents a dozen. Fresh figs, from Florida, cost twenty-five cents a quart. Florida and Jamaica oranges, Mandarins and grape-fruits, luscious Japanese persimmons, and large bunches of Black Hamburg grapes, grown under glass in England, are a few of the choice fruits of this time. Green Gages, from this state, Coe's Late Red and German plums and Gros prunes, from California, Idaho and Oregon, are still occasionally seen. Large Abakka pineapples, and Bartlett pears held over in cold storage, are among the most costly offerings. Apples add to the showy effect of every collection of fruit, and among the best sorts in market now are western Jonathans, Virginia Albemarle Pippins, Wine Sap and Johnson's Winter, from the same state, Snow, Northern Spy, Greening and King, from New York. The offerings of fruits by Italian and Greek vendors on the streets are as abundant now in early November as in midsummer, and in the less glaring sunshine of these clear, crisp days, the displays seem even more showy, although many brilliantly colored fruits are no longer in season. Bananas from Jamaica and Central America are sold at from twelve to twenty cents a dozen. Large Beurre Bosc and other late varieties of pears, from California, cost from one to three cents each, and their solid spicy flesh makes them a particularly satisfying portion for a small outlay. The best of the less costly apples, such as Ben Davis, from Virginia and New Jersey, Baldwins, from New York, and Phoenix, from New Jersey, are popular, together with choicer varieties of the grade known as fair in the wholesale trade. Handsome Flame Tokay grapes, from California, cost ten cents a pound, and large, handsome Black Moroccos sell for the same price.

Professor Waugh has recently organized a Horticultural Seminar, which is intended to be a centre of advanced horticultural study in the University of Vermont, and membership is restricted to students taking advanced elective studies in the department. An opportunity is offered in connection with the Seminar to take up lines of individual study. Special electives may be taken in the following subjects, among others: Advanced study in evolution, pomology, landscape-gardening; library courses on special topics; critical study of French or German horticultural works; experimental problems. Mr. John Craig, Dominion Horticulturist, was present at the first meeting and spoke on The Geographical Distribution of Fruits in Canada. At the second meeting Professor Waugh read a paper on Ideals of Horticultural Instruction, and at the third meeting Professor F. C. Sears, of Wolfville, Nova Scotia, formerly of the Utah Agricultural College, spoke on Horticulture in Colleges last winter in GARDEN AND FOREST (see vol. x., p. 89). Professor Waugh regards individual assignments as of special importance. As an example of the scope of the work in the University of Vermont, the following thesis subjects among those prepared for the class in evolution may be mentioned. Abstracts of these theses constituted the programme of a meeting of the University Botanical Club: Alpine Flora of Vermont, its Origin and Distribution; Progression and Degeneration in Evolution; Growth Force as a Source of Variation; The Hereditary Transmission of Disease; Evolution of the Petunia; Cross-fertilization and Hybridization in Rosaceae; The Inheritance of Acquired Characters; Weismannism, a Study of the Writings of Dr. August Weismann; Naegeli's Philosophy, a Study of the "Mechanisch-physiologische Theorie der Abstammungslehre"; Early Maturity as a Question of Phylogeny; Physiological and Climatological Constants: The Relation of Climate to Plant Phenomena.

Japanese peanuts are a novelty at Davy's, the nut-store on lower Fulton Street which has grown familiar to New Yorkers in the past forty years. These peanuts are of uniform size and considered superior in flavor to the Virginia product. In England Japanese peanuts enter into successful competition with those from our southern states, but this is the first attempt to introduce them into America, at least into the Atlantic coast states. In Virginia and other southern states peanuts are hand-picked, the stems being removed and poor nuts rejected, and they are cleaned of earth and dust in fan-mills. These Japanese peanuts have undergone no special preparation, and so are less attractive. But heavy expense for freight is the most serious hindrance to the establishment of this trade with Japan. Seeds of the Japanese peanuts have been planted in Virginia with a view to obtaining a superior strain for cultivation here. About 85,000 bags of peanuts were marketed in this city during the current year, each containing about four bushels. Most of these come from Virginia, with occasional shipments from North Carolina. Those from the latter state are, as a rule, of smaller size. The new crop is usually on the market by November 1st, and advance shipments are now expected daily, though the season is belated about a fortnight, owing to recent heavy rains in the south. Generally the crop is gathered during six weeks following the middle of October. In an exceptionally forward season new peanuts have been offered in New York on October 16th. Four grades are recognized, known as fancy hand-picked, extra hand-picked, third grade and "pops," the latter being small and empty or poorly-filled shells blown from the mills during the cleaning process. Many of the lower-grade peanuts are shelled by machinery in Virginia for confectioners' use. A small variety, grown from Spanish seed, is most in favor with confectioners. Many years ago one New York house handled about one-twentieth of the entire crop of southern peanuts. But this trade has greatly changed, and the business is now mostly done in Norfolk. Formerly peanuts were sold by the bushel, but during the past twenty years wholesale lots have been handled entirely by the pound. Five cents is a fair average wholesale price for the grade known as fancy hand-picked. Forty years ago one of the Mexican or Spanish silver "shillings" current in this city, and valued at twelve and a half cents, was the retail price of a quart of peanuts. Later, the same quantity cost twenty cents, and at this time, ten cents. A common name for peanuts among the negroes of Carolina and Georgia is goobers, and ground-nuts is a not unusual name south of New York. Peanut-plants, occasionally seen here as a novelty, are singularly interesting to those not familiar with their habit of growth, in the small orange-colored blossoms in the axils of the leaves and the stems which find their way into the soil from this part of the plant, and nourish the fruit, which is borne underground.

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New Dangers to Public Parks.

IN praising the man whose recent death means a heavy loss to the readers of this journal, and in noting his long usefulness as the most keen-eyed and devoted defender of the public parks of New York, the daily papers have dwelt forcibly upon the dangers which threaten these parks from the "assaults of the ignorant and vicious." But the parks are threatened by other dangers, newer than these, more subtle and insidious, less easily recognized as dangers, and therefore less likely to be frankly and forcibly resisted. And the consciousness of this fact greatly augments, among those who keep close watch upon our parks, the regret which every intelligent American must have felt when he heard of the death of Mr. Stiles.

The ignorant and the vicious have long been enemies of the parks—persons who deny their utility because it cannot be translated into terms of dollars and cents; those who are eager to injure them for the sake of giving to the city something, advantageous, perhaps, in its own way, which they think of more "practical benefit"; who wish to exploit them for their own profit or who plan to fill them with ugly objects; who barbarously injure their grass, trees, flowers or monuments for their own mischievous pleasure; or who think they know more about caring for them than their professional superintendents, and therefore try to "arouse the public" whenever a dying tree is cut or any other needful and desirable work proposed.

These people represent the unintelligent, uncultivated and unconscientious elements of the population. They are now recognized as enemies of the public, which in some degree is on its guard against them. Teachers, champions and leaders are still needed to defend the parks from their possible attacks. But the public is now easily roused to oppose their worst efforts; and it is probable that no such bold assault upon Central Park will again be attempted as the effort made a few years ago to run a speedway through it, or the equally horrible one to turn part of

it into a barren parade-ground. And the public may likewise be counted upon, although not so confidently, to forbid the attempts of individuals to dot it with penny-in-the-slot machines or newspaper kiosks, or otherwise to disfigure it and to pervert it from its true service for the profit of personal greed under the pretense of supplying special "conveniences" or "pleasures" to its frequenters.

The danger to our pleasure-grounds from engineers necessarily employed upon them, but devoid of the right artistic feeling and unwilling to abide by the counsels of landscape-gardeners, has recently been dwelt upon in these pages and may for the moment be passed by. What we wish now to point out is that it seems probable that more and more schemes to further definitely intellectual or æsthetic ends will be prosecuted without due regard to the integrity and beauty of our parks as works of landscape-art, and that the patrons of science and literature and of art of other kinds are likely to try to injure our great artistic creations like Central and Prospect Parks. And this is, of course, a very insidious danger, as the schemes may be worthy in themselves, and the people who urge them are those whom the public has been told it should trust most implicitly in intellectual and artistic matters.

It is at least a question whether the new Public Library should have been allowed to claim the site of the old reservoir on Fifth Avenue, which otherwise would have been added to the area of Bryant Park. The Metropolitan Museum should not have been given a site within Central Park, but placed beyond its limits, as the Museum of Natural History was upon its western borders. And the stand which Mr. Stiles took, as Park Commissioner, in opposing the desires of the Botanical Society—which, if carried out, will seriously impair the peculiar beauty of Bronx Park and its utility as a public pleasure-ground—must convince all the readers of this journal, who know of his devotion to botany and horticulture and to the task of spreading an interest in them among the people at large, that here, too, a great mistake has been made, and by just the kind of persons who ought to be trustworthy guides with regard to the right conservation of the public's park-lands.

These few instances illustrate one phase of apprehension—the danger that buildings for public purposes will more and more absorb the narrow and precious spaces set apart for the people's refreshment and enjoyment. Each such instance is deplorable in itself and as a precedent for future enterprises of similar kind. Nor is New York the only city which needs to be warned along these lines. The beautiful park which Mr. Olmsted laid out in Buffalo is threatened with the erection of buildings which would be public benefits if placed elsewhere, but public misfortunes as features in a naturalistic park. Even the small and incomparably precious State Reservation at Niagara Falls has had to be defended against a misfortune of a like sort; and there is no town in the United States whose parks are safe in this respect. It is high time that the public should awaken to the fact that no buildings whatsoever, except those absolutely required for park purposes proper, should be allowed within a park, and that the projectors of all others should buy their own sites or, if these must be purchased with public money, that they should be placed outside of park limits.

This is not merely because every foot of open public land is precious as such and should be held sacred to serve the health, the refreshment, and the outdoor pleasures of the people. It is also because, almost without exception, our pleasure-grounds are works of landscape-art in the exact sense—naturalistic parks—and are necessarily injured in their artistic character by the intrusion of buildings even of the most beautiful kinds. This is the point which many artists do not understand, and, therefore—as they are naturally regarded as the highest authorities in artistic matters—the damage which may be done to our parks by those who have not a true comprehension of them is, per-

haps, more to be dreaded than that from any other class of men.

It was hailed as a very good sign when, only a few years ago, American architects began to interest themselves in the environment of their buildings, and to regard it as an integral part of the works of art which they wished to create; but there are many indications that it is not always realized that while in some cases planted grounds must be mere adjuncts to buildings, in other cases the grounds are themselves the primary and important work of art, and that in the latter case no artificial object should be placed within them which does not serve their own proper purposes or enhance their own intrinsic beauty. As yet architects and sculptors do not always understand these truths. Individually and in corporate ways they have recently shown a great interest in the parks; they have done many things to improve them, and have prevented the doing of many things which would have injured them. But they have also proposed, if not achieved, some things which would be of lasting detriment; and the danger is that, as their interest in our pleasure-grounds develops they will more and more come to regard them as mere frames and settings for their own products, or possible exponents of their own gardening ideas. If sculptors and architects ever regard our parks simply as "good places" for the display of monuments and statues, they may grievously wrong the community by defacing its most precious artistic possessions. A man naturally intent upon showing his own work to advantage is easily tempted to think that the best site for it is the place where it will be most conspicuous; and the wide-open areas of a park specially appeal to his desires in so crowded and ill-planned a city as New York; but it is certainly clear that parks like Central Park are in themselves more valuable, even from the artistic point of view, than any object which can be placed within them, and that their beauty is of such a kind that it may easily be marred by the intrusion of an object in itself artistic. An architect may find it difficult to realize that the creation of a formal passage may fatally injure a work of landscape-gardening, planned in accordance with artistic laws less fixed and rigid than those of their own art, but none the less logical and binding, and this point of view sometimes leads him to think he understands the whole subject and is capable of "improving" the best work of such a master as Mr. Olmsted. This is no vague and unsupported assertion. It is well known that one of the most prominent and highly cultivated architects in New York has long declared that a straight boulevard ought to be run all along the eastern side of Central Park, within its borders, and has actually prepared a plan for such a boulevard and wished to have it adopted by the city authorities—a plan for a piece of in-artistic vandalism quite as glaring as the once-proposed speedway along the opposite side of the park.

In short, Central Park and almost all other American parks are naturalistic parks—are works of landscape-gardening, and their artistic value and greatest usefulness will be impaired by the intrusion of any building, however excellent it may be in design or useful in purpose, or of any statue or other monumental work, however great its artistic or historical value. Our great parks are country parks, and they are valuable to city communities not as museums or statue galleries, but as bits of country where the weary and discouraged can draw new breaths of life and hope from country sights and scenes.

THE Twenty-second Annual Report of the Commissioners of the Department of Parks of the City of Boston is before us and shows that up to the end of last year the Department had expended \$6,165,780.47 for land and \$7,568,099.24 for construction, or with \$13,356.10 for betterment expenses, a total of \$13,747,235.81, against which \$361,334.96 has been collected for betterments. The report shows that the work of completing the parks was

industriously carried on during the year. About two millions and a half are still needed to finish them according to the original designs of the landscape-gardeners, including nearly \$300,000 for buildings. The Commissioners suggest, however, that these estimates can be considerably reduced. The most significant thing in the report to those interested in the best development and care of the Boston parks is the announcement that during the year the services of a competent superintendent and general manager for the system have been secured, and that the irresponsible dual management, which has always existed since Boston has had parks, has at last been abandoned.

The following extract from the report of the landscape-gardeners, Olmsted, Olmsted & Eliot, to the Commissioners is of such general interest to all parkmakers that we are glad of an opportunity to reproduce it for their benefit: "There are certain parts of the parks, especially along the borders of waters and in existing rocky woodlands, where we have designed to have unusually wild and natural effects. For the gardener to plant in such situations exotic trees and showy garden shrubs and perennials would go far toward defeating the essential elements of our designs. The roads and paths of 'country parks' are placed in certain positions so as to command certain landscapes or bits of scenery thus and so, and conversely the vegetation, which in this climate makes the scenery, must be controlled, encouraged or modified accordingly. Unless planting, thinning and clearing are thus done sympathetically, the courses of the roads become meaningless and their cost is wasted."

Notes on Cultivated Conifers.—VI.

THUYA, or *Arbor-vitæ*, is a genus of four species, two being North American and two east Asiatic. It is well distinguished by its erect cones ripening at the end of their first season and composed of oblong, slightly imbricated, acute scales usually with from two to four seeds under each scale. All the species are pyramidal aromatic trees with flattened, lateral, pendulous or erect branchlets disposed in one horizontal plane and forming an open distichous spray, and dimorphic leaves. The species are grouped in two sections—*Euthuya*, to which belong the two American and the Japanese species, and which is distinguished by pendulous branchlets and thin, leathery, oblong, acute, mucronulate cone-scales, those of the two or three middle ranks being larger than the others and fertile, and by its compressed light chestnut-brown seeds with broad lateral wings and minute hilums. The second section, *Biota*, with a single Chinese species, is distinguished by erect branchlets and thicker and conspicuously umbo-nate cone-scales, the lowest four usually being fertile, and by its much-thickened dark red-purple seeds rounded or obscurely angled on the back and marked by large oblong conspicuous hilums.

The type of the genus, *Thuya occidentalis*, the *Arbor-vitæ* of gardens, is a native of eastern North America, being distributed from Nova Scotia to the shores of James Bay and Lake Winnipeg, and southward through the northern states and along the Alleghany Mountains to southern Virginia. It is an inhabitant of wet ground, often at the north covering great areas of springy swamplands with impenetrable forests or growing on the rocky borders of streams in situations where its roots can obtain an abundant supply of water, while at the south, where it is comparatively rare, it is found only on the banks of mountain streams. Under favorable conditions it occasionally attains the height of fifty or sixty feet and forms a stout much-branched and buttressed trunk sometimes six feet in diameter. Such specimens, however, are exceptionally large, and trees thirty or forty feet in height, with trunks two or three feet in diameter, are much more common. The *Arbor-vitæ* was probably the first American tree cultivated in the Old World, as it was known in Paris gardens before the middle of the sixteenth century, and

Belon in 1558, in the first book devoted to conifers, published the earliest description of it.

Too stiff and formal, perhaps, in outline, when it is planted as an isolated specimen on high ground, where it usually appears out of place and out of harmony with its associates, the *Arbor-vitæ* is admirably suited for massing on the borders of streams and lakes, where it properly belongs and where it harmonizes with its surroundings. It bears clipping well, and its value as a hedge-plant was shown many years ago by Mr. A. J. Downing, who made it popular in American gardens for this purpose. Few trees show a greater tendency to seminal variation, and many forms have been raised and propagated by nurserymen, no less than forty being described in a recent European work on conifers, while there are several others known only in American gardens. Many of these forms show their distinctive characteristics only while young, and soon grow into the normal form, and in some cases several names have been given to the same plant originating independently in different nurseries. It would not be profitable to describe even a few of the most distinct of these plants, for any one who will sow a quantity of *Arbor-vitæ* seeds will be sure to find among the seedlings a number of forms as novel and interesting as any now in cultivation. It is, however, worth stating again, perhaps, that a plant commonly known in this country as the Siberian *Arbor-vitæ* is a form of *Thuya occidentalis* which originated several years ago in Ware's nursery, in England, and that it is correctly called *Thuya occidentalis* Wareana. All the abnormal forms of *Thuya occidentalis* can be propagated by cuttings, which strike readily, and among them are some exceedingly dwarf compact plants which are sometimes useful in small gardens and on the margins of beds of larger conifers.

The plants commonly cultivated under the name of *Thuya plicata* are garden forms of our eastern *Arbor-vitæ*, and must not be confounded with the *Thuya plicata* of Don, which is more frequently known as *Thuya gigantea*, although Dr. Masters has recently clearly shown that *Thuya plicata* is the older name. This is the *Arbor-vitæ* of north-western America, the Red Cedar of Oregon and Washington, the greatest of all the *Thuyas*, and a veritable giant among conifers. Near the shores of Puget Sound it is a common occurrence to see this tree 200 feet high with a massive trunk gradually tapering from a base fifteen or sixteen feet in diameter. As it grows in its native forests it is one of the most beautiful and graceful of the American conifers, with bright cinnamon-red bark and a narrow spire of branches, which sweep out gracefully from the stem, and are clothed with great Fern-like, pendulous, yellow-green branchlets. Nowhere forming pure forests, the western *Arbor-vitæ* grows singly or in small groves generally on low, moist bottom-lands or near the banks of streams, and less commonly on dry ridges and mountain slopes, which it sometimes ascends in the interior to considerable elevations, although it is only at the sea-level and under the immediate influence of the ocean that it grows to its greatest perfection. Ranging along the coast from southern Alaska to northern California, it penetrates also eastward along the banks of mountain streams through southern British Columbia and Washington to the western slopes of the northern Rocky Mountains, and is abundant on the Bitter Root and Cœur d'Alene ranges and in the territory north of Flat Head Lake. Plants obtained several years ago from this interior and comparatively dry region have proved hardy in the Arnold Arboretum, and in Mr. Hunnewell's Pinetum, where they are now growing rapidly, and promise to become large and handsome trees. In western Europe *Thuya plicata* flourishes, and large specimens are now common in European collections, in which a few seminal varieties with abnormally-colored foliage are preserved.

The Japanese *Arbor-vitæ*, *Thuya Standishii*, is a rare inhabitant of the mountain forests of the main island, and occurs only on the borders of streams and lakes usually at elevations

of 4,000 or 5,000 feet above the level of the sea. It is a small pyramidal tree occasionally thirty feet high, and very like our eastern *Arbor-vitæ* in coloring, but of more open and graceful habit. For thirty years it has been an inhabitant of American and European gardens, where it is much more generally known as *Thuyopsis Standishii* than by its true name. There is a well-formed and perfectly healthy specimen of this tree about eighteen feet high in Mr. Hunnewell's Pinetum.

The Chinese *Arbor-vitæ*, *Thuya orientalis*, the type and only member of the section *Biota*, is a small bushy tree with bright green foliage, and an inhabitant of the mountain districts of central and northern China. Long supposed to be a native of Japan, where for centuries it has been a favorite garden plant and where a number of abnormal forms have been perpetuated, it was probably one of the numerous plants carried by Buddhist priests from China to that empire, whence it found its way to Europe a hundred and fifty years ago, and now in all temperate countries it is one of the most commonly cultivated conifers. Hardy in sheltered positions as far north at least as eastern Massachusetts, the Chinese *Arbor-vitæ* is more common and far more vigorous and beautiful in southern than in northern gardens. Many varieties of this plant are propagated in European nurseries, but none of them is as hardy here as the typical form. The most remarkable of these varieties, perhaps, is the plant with long slender, flexible pendant branches (var. *pendula*) found by Thunberg in Japanese gardens and once believed to be a distinct species. In English and French gardens a dwarf globose and compact form (var. *aurea*) raised many years ago in the Knapp Hill Nursery, at Woking, is a favorite ornament. This plant has not proved hardy at the north, although south of New York it can be successfully cultivated. On this form the early spring growth is rich golden yellow, changing late in the season to the normal light green of the species. *Thuya orientalis*, *Meldensis*, which originated at Meaux, in France, in 1853, and was formerly considered a hybrid between *Thuya orientalis* and *Juniperus Virginiana*, is a juvenile state of the Chinese *Arbor-vitæ*, with acicular spreading leaves. All these plants, like all other *Cupressineæ*, can be propagated by cuttings which usually root rapidly.

Thuiopsis chiefly differs from *Thuya*, to which some authors unite it, while others consider it a *Cupressus*, in its ligneous cone-scales, much thickened and dilated at the apex, each bearing five seeds. The only species, *Thuiopsis dolabrata*, which is one of the most beautiful conifers of Japan, is easily recognized by its broad coriaceous leaves, which are convex and bright green above and concave and silvery white below, and are arranged in four ranks in opposite pairs, those on the upper and under side of the branchlets being closely appressed against the stem, while the lateral leaves are more or less spreading. In central Hondo this tree is common between five and six thousand feet above the sea-level, growing as an under-shrub in the dense shade of Hemlock forests, and every year buried in snow during four or five months. Sometimes it rises, however, when its crown reaches the light, to the height of forty or fifty feet, with a slender trunk covered with bright red bark, long, graceful drooping branches and a narrow pyramidal top. It is a tree which evidently requires shade and protection, at least while young, and in its native forests even the largest plants are surrounded and overtopped by taller trees.

In western Europe *Thuiopsis dolabrata* grows admirably, and there are already handsome, well-formed specimens in many of the gardens of southern England and Ireland and western France, but in this country it suffers from summer drought, and unless it is protected from the winter sun it soon perishes or becomes shabby and unsightly, although in sheltered positions it is hardy enough in eastern Massachusetts, and if winter conditions similar to those it enjoys in Japan and sufficient summer moisture could be given to it here, it might be expected to succeed. A form in which the

tips of some of the branchlets are white (var. *variegata*) has come from Japanese gardens, which have also given us a compact form with rather more slender branches and lighter green foliage than those of the ordinary form (var. *nana*), and there are one or two other varieties represented by names, at least, in European collections.

Libocedrus bears in many respects a close resemblance to *Thuja*, from which it chiefly differs in the structure of the fruit, which is composed of four or six scales, those of the lower pair being thin, reflexed above the middle and much shorter than those of the next pair; these are thick, woody, and wide-spreading at maturity, while the two inner scales when these are present are confluent into an erect woody septum. Eight species of *Libocedrus* are now known. One of these species is a native of semitropical south-western China; two are scattered through the mountain forests of western South America, from Chili to Patagonia; two inhabit New Zealand; two New Caledonia, and one western North America, where it ranges from southern Oregon along the mountains to Lower California. This, the *Libocedrus decurrens* of botanists, is a noble tree often one hundred and fifty feet in height, with a tall, slightly lobed trunk covered with bright cinnamon-red bark and sometimes seven or eight feet in diameter, and slender branches which are clothed with flattened pale yellow-green frond-like branchlets and which, erect above, and below sweeping downward in graceful curves, form for a century or so a narrow, open feathery crown which later becomes irregular in outline by the greater development of some of the branches which from horizontal become upright, and secondary stems.

Libocedrus decurrens has been cultivated in Europe for more than forty years and has already grown there to a considerable size, promising to become a long-lived and large tree. In the city of Washington there are good, healthy specimens in the grounds of the Department of Agriculture and of the Soldiers' Home, and this tree appears to be hardy near Philadelphia and New York. In New England it has not been sufficiently tested yet, but as its range is coextensive with that of the Sugar Pine, which is hardy in eastern Massachusetts, it is possible that it can be made to thrive in this part of the country if it is obtained from a cold, dry region like that at the eastern base of the Cascade Mountains of southern Oregon, or from northern California. It may be worth mentioning that in at least nine out of every ten European nurseries, owing to the mistake made by one of the early seed collectors in western America, *Libocedrus decurrens* is sold as *Thuja gigantea*, while the true *Thuja gigantea*, or, as it is now called, *Thuja plicata*, is sold as *Libocedrus decurrens*.

C. S. S.

Plant Notes.

Spiræa arguta.

THIS plant, one of many hybrid *Spiræas* raised at the Forest School at Munden by Dr. Zabel, is a decided acquisition as a garden plant, and one of the most beautiful *Spiræas* in cultivation. It is described by Dr. Zabel* as a hybrid between *Spiræa multiflora*, itself a hybrid between *S. crenata* and *S. hypericifolia*, and *S. Thunbergii*. Flowering very early with *S. Thunbergii*, it surpasses that plant in the gracefulness of its arching branches, its more abundant and larger flowers, and in its greater hardiness, the ends of the branches of *Spiræa Thunbergii* being almost invariably killed by the cold of northern winters, which occasionally also destroys a large part of the flower-buds.

Spiræa arguta in the Arnold Arboretum, where it has been growing since 1893, is now about four feet high, with slender stems covered with lustrous red-brown bark and furnished near the extremities with numerous elongated,

clustered, arching wiry lateral branches, which about the first of May, just as the leaves are unfolding, are covered on the upper side with crowded umbels of pure white flowers a quarter of an inch in diameter, and raised on slender pedicels about half an inch in length. The pale green leaves are oblong-obovate, entire below and coarsely toothed at the acute apex.

Our illustration on page 443 of this issue, from a photograph made at the Arnold Arboretum by Mr. James F. Codman, represents the end of a stem of *Spiræa arguta* with its numerous lateral flower-bearing branches which, erect in the illustration, are pendent on the plant.

Foreign Correspondence.

London Letter.

NYMPHÆA O'MARANA.—Kew is indebted to Mr. H. A. Dreer, of Philadelphia, for a tuber of this hybrid Water-lily, and the plant has been an attraction among the tropical aquatics for the greater part of the summer. It was described in *GARDEN AND FOREST* (vol. viii., page 96), where its origin is stated to be due to a cross between *Nymphæa dentata* and *N. Sturtevantii*, the latter a hybrid of rare quality, but, with us, not free-flowering. In its bright rose-pink color, with an almost pure white stripe down the middle of each of its two dozen or so broad petals, *N. O'Marana* differs from all other tropical *Nymphæas*. Mr. Dreer states that with him the flowers were from twelve to fifteen inches in diameter. At Kew they have not exceeded nine inches. Probably, however, the flowers are larger when the plants are grown in full sunshine. In my opinion this is one of the three best forms of *N. Lotus*, the other two being *N. dentata* (white) and *N. Devonensis* (red). If we add to these *N. Zanzibarensis* (blue-purple) we have a quartette of the best tropical *Nymphæas*.

CRESTED-FLOWERED BEGONIAS.—The latest "freak" of the tuberous *Begonia* is the development of a plumose crest on the inner surface of the petals, not unlike that developed by the Persian *Cyclamen*. This crested *Begonia* originated in a Continental garden, the stock being secured by a nurseryman who has lately distributed seeds from which a large proportion of the plants raised has possessed this crested character. It is noteworthy that sports of this nature are hereditary, for Messrs. Low & Co., to whom we owe the origin of the crested *Cyclamen*, found that ninety per cent of the plants raised from its seeds had crested flowers. At present the crested *Begonia* is merely a curiosity; some growers call it a disfigurement, but there is no saying what it may lead to. A *Begonia* with flowers like a Cockscomb *Celosia* would no doubt find many admirers. "The case of crested shows that the plant possesses the power to strike out a new line and to develop characters which would even be regarded as having specific value," has been said.

BEGONIA GLOIRE DE LORRAINE.—One of the most charming exhibits recently seen at the meetings of the Royal Horticultural Society was a group of about thirty plants of this *Begonia*. Each plant grew in a five-inch pot and was eighteen inches high and wide, forming a compact ball-like cluster of bright green leaves and elegant rose-pink flowers. They were grown by one of our cleverest market nurserymen, Mr. May, of Edmonton. I mentioned this hybrid in a letter last December, but, good as the plants were that I had seen then, they are eclipsed by those now noted. Some of the *Socotrana* hybrids are "miffy"; indeed such plants as *Winter Gem* and *John Heal* may be described as difficult to manage, but *Gloire de Lorraine* is as easily grown as *Begonia Dregei*, one of its parents. In addition to its good qualities of freedom of growth and charm of flower it has also that of durability, plants in flower in October remaining in beauty until February or March, the racemes gradually extending in length until they have long flexuose stalks. It is a most valuable winter-flowering plant for the warm greenhouse.

* *Die Strauchigen Spiræen der Deutschen Gärten*, 22.—*Gard. Chron.*, ser. 3, xlii. 3, l. 1.

STREPTOCARPUS.—We have now a great range of flower color among the hybrid *Streptocarpus*, and along with it a habit and leafage which commend the plants to the grower of decorative plants more than the earlier crosses did. It is now generally known that several species were originally crossed to produce this race, the species used being widely different from each other. This fact makes it very remarkable that the crosses are now so far fixed in character that the various colors will come true from seeds. In the case of *Primula Sinensis*, the garden *Cineraria*, and the Persian *Cyclamen* the colors generally are reproduced from seeds, but I do not know of another instance where distinct species have been crossed for the progeny to be thus exactly reproduced. In the *Gladiolus*, *Begonia* and other genera seeds are of no value for purposes of propagation if the reproduction of the characters of the seed-bearer is desired.

those of size, and there are specimens in the Kew Herbarium of *P. involucrata* quite as large as his plant. The dimensions of this are: Breadth of tuft, twelve inches; length of leaf, including oblong blade, six inches; flower-stems, of which his plant produced ten, sixteen inches; umbels three to six flowered. It is a charming Primrose for a cosy corner of the rock garden.

CALLISTEPHUS HORTENSIS.—This is the plant popularly known as the China Aster, the *Aster Chinensis* of Linnæus. It was introduced into the Jardin des Plantes, Paris, from China, about a century ago. The many changes wrought in its character, amounting to racial distinctions almost, we owe chiefly to French breeders, first among whom we may mention Monsieur Vilmorin. The type had long ago disappeared from cultivation, and so far as I can gather, no colored picture of it existed, so that we knew little of the



Fig. 56.—*Spiræa arguta*.—See page 442.

Messrs. Veitch & Sons have now many new hybrids of this genus.

PRIMULA TRAILLI.—This is a form of *Primula involucrata* (Munroi), one of the many species of *Primula* found on the Himalaya, where it grows at an altitude of from 12,000 to 15,000 feet. Forms of it are also found in Europe, northern Asia and Arctic America. It is hardy at Kew and is remarkable for its tall scapes bearing nodding umbels of about half a dozen pure white, very fragrant flowers. A figure of the type will be found in Lindley's *Botanical Register*, 1846, t. 31. Mr. G. F. Wilson, who has lately raised, flowered and exhibited plants of *P. Trailli*, is of opinion that it differs specifically from *P. involucrata*, but the differences as set forth by him in *The Gardeners' Chronicle* this week, where his plant is figured, are only

character of the progenitor of the China Aster beyond what herbarium specimens showed. Now, however, thanks to a French missionary in China and Messrs. Vilmorin & Co., we have the type again in cultivation, and a batch of plants raised from seeds supplied by the latter and grown in a border at Kew reveal it as a plant of decided beauty, "far more elegant in habit and beautiful in flower than any China Aster I have ever seen," was the remark of a gardener-artist who saw the Kew plants. These formed an irregular group from twelve to eighteen inches high, branched freely and clothed with healthy dark green toothed leaves. The flowers were from three to five inches in diameter, with a broad yellow disc surrounded by a single row of broad strap-shaped ray florets, colored pale mauve. The charm of the flowers was in their elegant

pose, their singleness and pleasing colors. Unfortunately, the plants have not seeded at Kew, but probably they have done so in the nursery of Messrs. Vilmorin & Co. in the south of France. The original China Aster is as certain to find admirers as the single Dahlia and the single Chrysanthemum.

CHRYSANTHEMUM NIPPONICUM.—I recommended this new Japanese Daisy last year as a pot-plant to flower in winter. Some plants of it grown at Kew out-of-doors with the common Chrysanthemums have made compact bushes a foot high and are now bearing erect daisy-like flowers with yellow disc and white ray, each flower being three inches across.

A MODEL NURSERY.—The late Mr. Bause was one of the most successful breeders and growers of indoor plants in Europe. After having served some of the principal London nurserymen he started a nursery for himself at Norwood, near Sydenham, about fifteen years ago. He died two years ago and his nursery is now controlled by his son, a young man, but a worthy successor of his father. I saw his nursery a few days ago and was so struck by the order, cleanliness and first-class cultivation there that I venture to call it a model of what a plant factory should be. The plants grown are all tropical and the houses are span-shaped, of various lengths, fifteen feet wide, the sides three feet, the central ridge eight feet high. The stages are formed of slates resting on iron battens and these are covered with a thin layer of cocoa-fibre or cinders. There is a wide central, and two narrow side stages, the paths being two feet wide. Seven rows of four-inch hot-water pipes afford the necessary heat. The stages are packed with plants of various sizes, all in the most perfect health, while on the hot-water pipes are rows of shallow boxes containing Palm seeds. Mr. Bause's specialties are *Cocos Weddelliana*, *Geonoma gracilis*, *Kentia Fosteriana*, *Phoenix rupicola* and *Livistona Sinensis*. Of each of these he sells from ten to twenty thousand plants a year, mostly from two to three feet in height. The cultivation is so excellent that almost every Palm bears every leaf it has developed from the seed to its present three, four or five year old condition. "My customers would not stick to me if my plants were not as perfect as I can make them," said Mr. Bause. *Dracæna terminalis* and all the very best of the *Dracænas* of that section are grown in large numbers and in the most perfect manner, every leaf as clean, well formed and richly colored as possible. Mr. Bause, senior, raised nearly all the best of these *Dracænas* during the time when he was manager to the General Horticultural Company. *Crotons* are grown on an equally large scale and to the same degree of perfection. *Caladiums* are another specialty, Mr. Bause having raised a large number of beautiful seedlings, most of which have been sent out by Messrs. J. Veitch & Sons. *Nepenthes* are grown suspended from the roof in almost every house, perfect little plants in teak baskets, each bearing perhaps half a dozen matured leaves, from each of which hangs a large, well-colored pitcher. Mr. Bause grows all the best sorts, including such rarities as the true *N. sanguinea*, and even a plant or two of *N. Rajah*. I asked what special manure was used. "None," said Mr. Bause, "but we get the best soil we can and take special care as to the water, shading and ventilation." This is one of dozens of plant factories in the suburbs of London whose special function it is to grow the best plants in the best manner for the supply of the big nurseries.

London.

W. Watson.

Cultural Department.

Carnation Notes.

WE are now in the height of the Chrysanthemum season, and while these are at their best Carnations and other less showy flowers are liable to suffer some neglect. But though Chrysanthemums are supreme for a few weeks, Carnations, with proper attention, bloom satisfactorily during the whole year. Chrysanthemums are unquestionably the popular flower during part of October and November, but the public soon grows weary of them, and Carnations are assuredly

the flower of the masses and are a close rival of the rose in popularity.

The weather this autumn has been remarkably clear and warm and especially delightful during October. There have been but light frosts up to this time, and summer-flowering Carnations are still blooming quite freely, although these flowers, naturally, compare unfavorably with those now growing under glass. Few private places have special houses devoted entirely to Carnations. Chrysanthemums usually occupy some of the bench room at this time, and the temperature and atmospheric conditions have to be regulated to suit them. No particular harm is done to Carnations so early in the season by a slightly lower temperature; the nights are not yet sufficiently cool to render much fire-heat necessary, and as the houses become well warmed during the day Carnations open quite rapidly. The plants are now growing freely and the flower-stems are appearing abundantly on all varieties. No time should be lost in providing the plants with supports. We formerly tied up the plants loosely to wire rods held in position by wires drawn along the rows. While this system produced a neat effect, it had disadvantages. Some varieties of recumbent habit, like Daybreak, were difficult to tie, and unless the ties were loosened from time to time as the plant grew, many shoots near the centre became weak, spindling and almost blanched. A Carnation support which will give satisfaction to everybody has not yet been invented. All the air and light possible should reach every part of the plants. This is impossible when they are tied up in a bunch, as we too often see them, with a piece of white twine or raffia. We have just gone over our plants and cleaned them, and instead of staking them up have cut up a quantity of small-mesh wire netting (commonly called chicken wire) into strips eighteen inches wide, doubled this into an acute arch, and stood it between the rows, which extend across the bench. This keeps the plants from crowding each other and allows sunlight and air to strike between the rows. Stretches of wire may be drawn along the sides of the bench to hold up the shoots and prevent them falling over. As the season advances and the stronger stems appear stretches of white twine should be drawn a few inches apart from each side of the bench and crossed at right angles; this will support the flowers. One advantage of this system is that the pieces of netting can be lifted out at any time when it is desired to stir the ground lightly and clean the plants, and this method is also advantageous in watering, as a hose can be passed inside of the arched netting. As to neatness there can be no question, for the plants practically hide the netting from view.

Rust is still more or less prevalent, but it appears to give less concern to growers than when it made its appearance a few years ago. A moist atmosphere, crowded, unclean and unsupported plants and uneven temperature will cause this disease to spread rapidly. Overhead watering must be avoided, since the water does injury by lodging in the axils of the leaves, and washes off the bloom of the foliage provided by Nature as a protection against spores. On the other hand, a comparatively dry atmosphere, careful watering and ventilation, picking off dead, decaying and diseased leaves, and keeping the house perfectly clean, with no rubbish thrown under the benches, will all tend to keep rust in check. Some growers find a dusting of air-slacked lime keeps rust from spreading, and we have used this preventive with success. A syringing with the arsenical solution on badly affected plants once a week has proved beneficial. Probably the Carnation which has rust in the most virulent form this year is the fine yellow variety, Eldorado. It was attacked last year to some extent, but not sufficiently to impair its flowering qualities. This season our plants were so badly affected that we threw them away, and the stock of other growers in this vicinity is more rusty than usual. It is unfortunate that Eldorado should be the victim of this disease, for it is the best yellow Carnation we have ever grown. Such varieties as Buttercup, Louise Poroeh, Goldfinch and Bouton d'Or are not worthy to be included in the same class with it.

We are trying a few plants of the Mayor Pingree this season, sent out last spring by John Breitmayer & Sons, Detroit, Michigan. This proves to be a vigorous grower and throws up wonderfully strong flower-stems. The flowers thus far produced are large and of fine form. This is a promising variety which we shall watch with interest. William Scott, notwithstanding all that has been written about its failing popularity in the flower markets, is still planted as largely as ever by growers in this section. The variety which is to supersede it has yet to be introduced. Sorts like Edna Craig and Grace Battles, which were widely boomed before being sent out, are now never seen. Madame Diaz Albertine is almost altogether

discarded, William Scott being so much better. Bridesmaid is of little value, except when a few fine exhibition blooms are desired. Triumph, good in some parts of the west, has proved of no value as a persistent bloomer. Nicholson has had its day and appears quite run out. Rose Queen is only now and again met with. Abundance is a neat little plant for a side bench. Victor, one of the 1897 novelties, proves disappointing thus far. None of these varieties succeed except in certain localities, while William Scott seems to do equally well from the Atlantic to the Pacific, and is probably more extensively grown than all other varieties of its color. Among white varieties decidedly the best of the new sorts we have tried is Flora Hill, introduced by E. G. Hill & Co., Richmond, Indiana. The flowers are very large, freely produced and have a delightful odor. The plant is the most vigorous grower of any kind we have. Harrison's White, the so-called white William Scott, has proved disappointing; the flowers are few and of medium quality. Edith Foster is a very promising variety, with stiff stems and flowers of good size and form. Alaska is grown to some extent by commercial growers, but the small flowers do not usurp the place of those of Lizzie McGowan, which we still find to be the most prolific and best all-round white Carnation. This variety does not appear to be popular in the Boston market. The leading Carnation growers for that market seem unable to grow it successfully. In many New England cities hardly any other white variety is to be seen. Occasionally Mrs. Fisher is grown, and one cultivator in this vicinity has two houses devoted to it and refuses to grow any other kind. For summer flowering it is unapproached. Nivea, a slender-growing sort introduced by Mr. H. A. Cook, Shrewsbury, Massachusetts, is largely grown here this season, but it is not equal to some other sorts up to this time. F. Mangold is still the leading crimson. Meteor is generally discarded. Now and then a small planting of Sebec is seen; this is a good crimson Carnation and flowers finely outdoors in summer. It lacks a stiff stem, however, such as F. Mangold has. The new variety, Mrs. George M. Bradt, as seen in one of the houses of Mr. W. Nicholson, Framingham, Massachusetts, a few days ago, looked specially well; this is, without doubt, now the finest striped variety; the color is white, striped with scarlet. The flowers do not fade out as many of those on Helen Keller do, and it is far more prolific than Minnie Cook. Della Fox proved unpopular in the markets here last season and is generally discarded. Daybreak still holds its own as one of the most popular market varieties and continues to do well. Its habit of growth is not of the best, but no other kind has yet been sent out which will take its place. Maud Dean, white, with a blush centre, is a neat, compact-growing sort, but its color is not of the delicate shrimp-pink color which gives Daybreak its popularity. A first-class scarlet is still needed. Morello is a promising kind, but I think not so good as Jubilee. We still raise Hector, although it is not by any means an ideal grower. Such small varieties as John's Scarlet, Portia and E. G. Hill continue to be the leading market sorts here, and will probably be so until a scarlet variety with the many virtues of William Scott or Lizzie McGowan is introduced. Portia is perhaps the oldest commercial variety, largely grown for cut flowers, now on the market, as it is the healthiest.

Taunton, Mass.

William N. Craig.

The Storing of Bulbs.

BULBOUS and tuberous-rooted plants are indispensable for the garden in summer, and each autumn the best method of storing the bulbs and tubers must be considered. A great number of these plants rest annually at this period, and unfortunately, the plants that are taken the best care of while growing are often sadly neglected when at rest. They are frequently put to one side after they have flowered, as if they did not need further attention until it is time to plant them. But it takes a bulb longer to recuperate after flowering than it does to produce a crop. Often the flower-stem and leaves may be found within the bulb seemingly ready to start and come into bloom in a few weeks; but months of preparation are necessary for this growth to be possible. The Hyacinth and Narcissus are instances. What are known as Holland bulbs are for the most part spring-flowering, and are now in a cool cellar buried in sand and ripening for planting. Most of the south African bulbs and others from various parts of the globe are inclined to take their rest at this time, fortunately, and we thus have a store to draw upon when winter and spring bulbs are past.

Amaryllis are steadily increasing in popularity. These plants

are admirably adapted to house decoration and are easy to cultivate. Our stock has become so large that it is each year more difficult to store it. A cellar is not suitable, for at this time these bulbs need light and warmth to mature them. Much of the foliage is yet green, indeed *A. aulica* and its offspring are evergreen. It is unwise to cut off the stems and leaves, and these must die naturally. When the bulbs are perfectly at rest they may be stored under the benches or on shelves in the greenhouse; care must be taken that they do not become dust-dry or soaked with water. Amaryllis are for the most part deciduous, but a few roots will remain through the winter, and these are a great aid to the production of strong flower-spikes if they are properly taken care of and not allowed to rot or dry off. We are now starting a few of the bulbs which have matured earliest for an early display, and at the beginning of the new year all will be started. The only way to make up a collection of Amaryllis is to raise them from seeds of a good strain. Seedlings, however, are evergreen until they have reached maturity; that is, at the beginning of the third winter after sowing the seeds they begin to lose their leaves and should be treated like the older bulbs.

Gloxinias are, perhaps, the most showy of summer-flowering bulbs and are grown in large numbers. They are slow to go to rest if well grown and not neglected after blooming. We hesitate to dry off Gloxinias even at this time if they show no signs of drying, but give moisture as long as it is necessary to support the leaves that are building up the bulb to greater dimensions and vigor. After Gloxinias are dried off it is preferable to store them in the pots they grew in during summer. We frequently have not room enough to keep them in this way and they are shaken out and stored in boxes, soil being sifted in between the bulbs. Tuberous Begonias are treated in exactly the same way. If they have been used out-of-doors and have been cut off by frost they must be lifted and laid in an airy place until the stems part readily from the bulb, and then they may be put away in boxes. Both Begonias and Gloxinias are apt to suffer from what is known as dry rot in winter. A little moisture should be supplied to keep the bulbs plump, and then many of the root fibres will survive the winter and be an advantage in spring. It is often said that a place where potatoes may be safely wintered is suitable for storing Begonias and Gloxinias. I prefer a place with a little more warmth; a minimum of forty-five degrees is advisable, and certainly not more than fifty degrees as a maximum for any length of time if it is desired to have a late summer display.

At this time we shake *Achimenes* out of the soil in which they grew and use the pans for other bulbs. These bulbs may be picked out of the soil, placed in dry sand and kept perfectly dry during the winter if stored on a cool bottom in a cool house. We take the precaution to put a board under the pots or moisture would be drawn up by capillary attraction sufficient to start them too early, or at an inconvenient time. Our last *Achimenes* are just going out of flower; we find that these plants flowering late in September are a pleasing feature in the cool house; in the hottest summer months the flowers wilt at midday and the display is then short-lived.

We grow a large number of Japan Lilies for summer decoration, mostly of the *L. speciosum* type, and these have just been cut down and put in a cellar. There are no more valuable plants for use in late summer. To have them late it is advisable to store the bulbs in a cellar where there is moderate freezing. This will keep them dormant until it is safe to put them outdoors. If stored in a cellar that is frost-proof they will certainly start to grow before it is safe to have them outside, and in a glass structure their flowering period is hastened at least a month, and they will not last until the Japanese *Anemones* come in to take their place.

Nerides are valuable autumn plants and would, no doubt, be seen oftener if they did not take up so much valuable space in winter. As they flower first and then produce foliage they need care now. It is a mistake to repot them before they bloom, as we have found to our cost, but it may be safely done now. If it is not desired to increase the stock all the young bulbs may be taken off and thrown away. The point is to take the strain of support from the flowering bulbs or the display will be poor the next season. They should be potted according to their size, five or six bulbs in each pot. They should not again be disturbed for two years. With this treatment we have had a fine display this fall, and a good growth is now being encouraged.

Where summer decoration is required few plants lend themselves more kindly than the ornamental-leaved *Caladiums*. The set of Brazilian sorts shown at Chicago in 1893 has greatly increased the popularity of these plants, and they are becom-

ing better known each year. These are truly tropical bulbs, coming from under the equator, and cold is fatal to them, even for a short period. They must never be stored in a place where the temperature falls below fifty degrees, but above this degree of temperature there seems to be no limit. A friend winters his *Caladium*-bulbs on the pipes in a house where tropical Palms are grown; they are stored in the pots and soil in which they grew. A better plan is to shake out the bulbs at this time if the leaves have died off, and after cleaning off all decayed particles that are sometimes found at the base of the tubers, they should be placed in dry sand, new labels written for them, and stored in the boiler-cellar, as it is generally warm there. If decay is seen to have penetrated the tissues of the tuber, this must be cut away and some dry charcoal-dust mixed with a little sulphur be placed directly under the cut and filled round with sand. There will be no danger of losing valuable kinds if the bulbs are attended to in time. The newer English dwarf kinds are, without doubt, among the finest achievements of the hybridizers' skill, and reflect great credit on the raiser and distributors. Unfortunately, their price is almost prohibitory; but we have noticed that these highly-colored varieties are slow to increase, their vigor in this direction being dependent on the amount of green coloring matter contained in the leaves.

Gladioli, *Acidantheras*, *Tritonias* and *Montbretias* are all of the same nature from a cultivator's standpoint. They should be lifted in autumn as soon as frosts have killed off the tops. The new bulbs are then cleaned free of old roots and the old bulb that adheres to the base of the new one. After being laid out to dry for a few days in an airy dry place they are best kept in strong paper bags such as Holland bulbs come in. These should be suspended in a dry cool cellar free from frost. If care has been taken to free them from moisture they can be safely left until the next midsummer for the latest planting. We separate *Gladiolus*-bulbs into two sizes, many of the largest being set apart for early use in pots. These are started in the greenhouse soon after January, and flower in the pots in May, being planted out in the border to mature. Some of the largest bulbs are also kept for late planting. Cultivators of large quantities of *Gladioli*-bulbs find that the best way to winter their stock is to suspend it in a cellar as already described, except that when many bulbs are stored coarse bags are used, so as to admit air and let the moisture escape. If the bulbs are moist root-action will begin long before planting-time, and the contents of the bags will be a mass of roots that must be broken to separate the bulbs.

This year we have planted out our *Gloriosas*. They promise to be of more value outdoors than in the greenhouse, as their liability to insects in heat makes it difficult to succeed with them. When planted out there is no trouble of this sort and they flower freely. They may be lifted and stored like the *Caladiums* after frost has killed them back. It will be found best to start them in heat to bring them forward, or they are likely to remain in the soil half the summer before they begin to grow. Both *Gloriosa superba* and *G. Plantii* give satisfaction when used in this way.

Dahlias and *Cannas* may be stored in a frostproof cellar. *Cannas* must be placed on a perfectly dry bottom and most of the earth shaken out, or decay from moisture will follow. We once lost our whole collection from this cause. *Cannas* really need a little warmth to do them justice, especially the newer ones, as they seem to have a tendency to be evergreen. *Cannas* will also winter perfectly under the benches in a cool greenhouse if boards are placed under the roots. If they are moist they will start to grow before the proper time, and too much space is taken up in the houses when it can least be given. We prefer dry storage in a cellar that would be considered warm.

South Lancaster, Mass.

E. O. Orpet.

The Forest.

Natural Reforestation on the Mountains of Northern Colorado.—II.

IN noting the conditions that seem favorable to the starting and development of new forest growth, I have frequently seen confirmation of the often repeated and generally accepted statement that north slopes are more quickly covered by new growth than southern. There are occasional exceptions, however. The reason for the difference of growth on the slopes rests, apparently, in the more vigorous action of the sun upon the south slope; the nearly perpendicular rays melt the winter snows,

exhaust the soil moisture and parch the vegetation very quickly. Differences in the two slopes are apparent even at the time of burning, and, owing to the greater dryness, vegetation on the south slope will burn more completely. On the north slope the tangle of unconsumed remnants serves as a protection to the young growth and nurses it beyond the critical stage, while on the south slope the young plants, unprotected from the fierce rays of the sun, succumb quickly, and the slope remains barren.

In the lower mountains, at from 7,000 to 8,000 feet, there are several large and a greater number of smaller bodies of young timber that are attractive. The species is almost exclusively *Pinus contorta*, var. *Murrayana*, the Lodge Pole Pine. The trees stand thickly together, and the main body of any particular group as seen from a little distance will show a height of from fifteen to twenty feet. Penetrating to the interior of any of these bodies of timber we find that the trees, now green and vigorous, constitute but a small proportion of those that started in the race. The first growth of seedlings must have been very thick, and it seems from observations made that seed continued to germinate for several years after the main body started. Here are found the remains of thousands of young trees that, starved out by their more vigorous neighbors, have died and are slowly returning to the earth from which they came.

Well in from the border of one of these forests, in a spot where Nature's methods had met with no interference, I chose four trees to represent the best development of the forest, not taking the largest, but such as represented the largest number of thrifty trees. The average of these equaled a tree nineteen feet high, 3.8 inches in diameter at the ground, and fifty-two years old, as ascertained from a count of the annual rings. The rate of growth of this average tree for the first fifty years would be as follows:

	Diameter. Inches.	Gain in diameter by decades. Inches.	Percentage of gain by decades.	Percentage of whole by decades.
At ten years, . .	1.			27.6
At twenty years, .	2.	1.	100.	55.2
At thirty years, .	2.69	.69	34.5	74.3
At forty years, .	3.19	.5	18.5	88.1
At fifty years, . .	3.62	.43	13.4	

One other tree was taken at this point, chosen for the smallest diameter in proportion to the height. It measured eleven feet eight inches high, was one inch in diameter at the ground, and was by the annual rings thirty-five years old.

Its development by decades was as follows:

	Diameter. Inches.	Gain in diameter by decades. Inches.	Percentage of gain by decades.	Percentage of whole by decades.
At ten years, . .	.25			28.6
At twenty years, .	.59	.34	137.5	67.8
At thirty years, .	.87	.28	47.4	

A further observation in this forest, bearing on the thickness of seedlings, and the dying away from starvation, was as follows: From a ground space six inches square grew six trees. The largest was ten feet eight inches high, and 1.38 inches in diameter at the ground, apparently thrifty and vigorous. The next smaller was six feet six inches high, and .75 inches in diameter at the ground. This tree was living, but was plainly less vigorous than the larger one. The next smaller was four feet eight inches high, and .50 inches in diameter at the ground, and was dead. The next smaller was three feet six inches high, and .50 inches in diameter at the ground, living, but weak, and evidently growing weaker, as indicated by the yearly growth. The next was dead and had been broken off at three feet above

the ground. The diameter at the ground was .50 inches. The sixth tree was dead, two feet high, and .25 inches in diameter at the ground.

The areas of young forest here spoken of offer splendid opportunities for the spread of fires when once started, and there is abundant evidence that many such tracts have been entirely destroyed. Timber bodies that have been partially burned are common, and in a few places I have noted evidences, living or dead, of three generations. In one locality examined, the ground under the new growth was thickly covered with the rotting trunks of young trees, and the average of several counts made of the rings of these dead sticks indicated an age of thirty-two years at the time of burning. This would point to 1878 as the probable year when the last fire occurred there. The new growth averaged twelve years, so that in this case six years would appear to have elapsed between the burning and the germination of the seeds in the ground. Four specimens, chosen as being the smallest cone-bearing trees present, gave figures as follows :

	Height. Inches.	Diameter at ground. Inches.	Annual rings.
No. 1.	18	.35	12
No. 2.	14	.40	12
No. 3.	17	.35	10
No. 4.	17	.35	12

The starting of new growth has here been tardy and scanty. The scattering living trees are from twelve to fifteen years old, and I should place the date of burning as at least twenty-five years ago.

Natural processes for reclothing these denuded areas appear from our observations to be very slow ; but, unmo-
lested, the task would in time be accomplished. The trouble seems to be that the destructive agency of fire, let loose by the carelessness or viciousness of man, tears down rather faster than Nature can build up, so that, instead of advancing toward a more extended forest area there is a constant retrograde movement. Fires of greater or less magnitude occur every year, and it seems likely to be a matter of a comparatively few years when the whole region, except in much-favored spots, will be stripped of its forests.

Colorado Agricultural College.

Charles S. Crandall.

Exhibitions.

Chrysanthemums in Boston.

UNFAVORABLE weather during the early part of last week, at the time of the opening of the Chrysanthemum Show in Boston, somewhat lessened the number of exhibits. The two halls were well filled, however, without the usual crowding, and the exhibits were thus placed to good advantage. The size of pots for specimen plants was limited to ten inches, and the specimens were smaller than in former years. This is a step in the right direction, and all plants were uniformly well grown, more even in size than heretofore, and none were of abnormal size. The prizes for plants in pots were about equally divided between Mrs. B. P. Cheney and N. T. Kidder, Esq., and in some instances it was difficult to decide which really excelled. Mr. Kidder secured first prize in the class of twelve plants, and Mrs. Cheney was awarded first honors in most of the other classes. Prizes for plants were also awarded to Mrs. A. W. Blake, for twelve different varieties grown to one stem and one bloom ; to James L. Little, Esq., and to Dr. C. G. Weld.

The class of plants with a single flower, grown in a six-inch pot, was well contested this year. A number of exhibitors showed excellent flowers on dwarf plants, such as are specially useful for decorative purposes ; all the leading varieties were grown in this way, and were much admired.

The circular groups of Chrysanthemums, arranged for effect, attracted general attention. The group shown by Mrs. A. W. Blake was declared the best, and other exhibitors were Dr. C. G. Weld and J. L. Gardner, Esq. Foliage plants were used among the Chrysanthemums with admirable effect.

Messrs. E. M. Wood & Co., of Natick, had a striking exhibit of cut flowers in vases, ten blooms of one variety. The new Evangeline, white, was conspicuous, not only in this class, but was one of the most admired of all exhibits. The flowers were remarkable for purity of color and solid texture. Mrs. Perrine also showed to advantage. This is, without doubt, the purest pink chrysanthemum in commerce and was notably good in most collections in the exhibition. Messrs. Wood & Co. were also winners in the class of twenty-five blooms. David Nevins, a comparatively recent exhibitor, was among the winners in many classes, and his exhibits this year showed remarkable advance over those in former seasons. Cornelius Vanderbilt, Esq. (Mr. Robert Laurie, gardener), sent some remarkably good flowers from the gardens at Newport. The vase of Peter Kay, a new yellow incurved Chrysanthemum, similar to Major Bonafon, won first premium as the best new yellow now in commerce. It was recently accorded 87 points in New York by the Chrysanthemum Society of America. A vase of Inter-Ocean, also shown by Mr. Laurie, won first honors among pink flowers. Joseph H. White, Esq., exhibited a new pink incurved flower which resembles Ada Spaulding, but is larger and of deeper color. It has been named Mrs. Gertrude Brydon. This was declared the best incurved Chrysanthemum not in commerce. H. McKay Twombly, Esq., Madison, New Jersey (Mr. A. Herrington, gardener), sent two fine vases of flowers. One of these contained blooms of Frank Hardy, the most sensational flower in the show ; these are very deep, the petals being creamy white and somewhat twisted. This novelty is of English origin, and, unlike most English Chrysanthemums, seems well adapted for cultivation here. Another good novelty was Pennsylvania, apparently a sport from Philadelphia, it being identical with that variety in shape, but a beautiful shade of clear yellow. It won a first-class certificate for the exhibitors, Hugh Graham & Son, of Philadelphia. Another notable seedling was a pink incurved Japanese flower shown by Mr. Frederick Cole, gardener to Arthur Hunnewell, Esq. A new primrose-yellow sport from Mrs. H. Robinson was shown by E. M. Wood & Co., of Natick ; this has been named Mrs. O. P. Bassett. But few incurved or anemone-flowered kinds were shown. Other winners of prizes for cut flowers were John Simpkins, Esq., Mrs. Cheney, E. S. Converse, Esq., James L. Little and Charles H. Souther.

A table of Orchids, tastefully arranged, was exhibited by Mr. J. S. Bailey. This comprised well-grown examples of Cattleya labiata, Oncidium Rogersii and a superb variety of Miltonia Moreliana, called atro-rubens. The latter was awarded a certificate for its unusual depth and richness of color.

A creditable display of early-flowering Carnations was made by Mr. Nicholson, of Framingham, his vase of Mrs. George M. Bradt being the finest fancy variety shown ; it is similar to Helen Kellar, but superior to that fickle sort, and is, no doubt, the best fancy Carnation of that color. Mr. Peter Fisher also showed a new variety called Mrs. T. W. Lawson, a bright rose-pink. This is not yet in commerce, but has been tried for three years, and has proved its good qualities. It is altogether the brightest carnation in this color. Better names are needed for new Carnations ; the commemorative and descriptive titles are apt to be cumbersome, are soon abbreviated, and lose their original significance.

Gratuities were awarded for flowers to Mrs. E. M. Gill for chrysanthemums ; to William Nicholson for chrysanthemums and carnations. J. J. Van Alan, Esq. (Arthur Griffin, gardener), received a silver medal for the hybrid Begonia semperflorens. A first-class certificate was awarded to Peter Fisher for carnations. A. Roper received Honorable Mention for carnation Mayor Quincy, and Joseph Hilbert, Nyack, New York, for a sport of Swainsonia.

Notes.

Ben Davis apples, considered inferior here, seem to have won favor in Germany through their showy color and good-keeping qualities, and a sale of American fruit of this variety is reported to have realized \$6.01 a barrel, wholesale, on November 2d, in Hamburg.

Among the plants which assume brilliant coloring late in the autumn none equals, perhaps, our common high-bush Blueberry, *Vaccinium corymbosum*, which early in November lights up many northern swamp borders with its flaming foliage. The value of this Blueberry as a garden plant has been often insisted on in the columns of GARDEN AND FOREST, but we cannot refrain from repeating that it is one of the most beautiful of all hardy shrubs. Beautiful in early spring with

its waxy-white bell-shaped flowers, beautiful in summer with its bright blue fruit, and especially beautiful now after the leaves have turned. It is a tall shrub and in good soil soon grows into a shapely specimen:

The change from northern-grown to southern fresh vegetables has gradually taken place in our markets, while the weather in this section is yet delightfully bright and mild, with hardly any suggestion of approaching winter. Peppers, cucumbers and the first tomatoes are now coming from fields in Florida. Eggplants and okra come from the same state, and green peas from Virginia. The supplies of string beans are received from Virginia and from North and South Carolina.

Prunus subhirtella is another Japanese Cherry which promises to become a valuable ornamental plant in our northern gardens. Like *Prunus pendula*, which it resembles also in the structure and size of the flowers, it blooms before the appearance of the leaves. In the Arnold Arboretum, where *Prunus subhirtella* has proved hardy and flowered abundantly for the last two or three years, it is now a broad bush with slender erect branches and ovate-acuminate dark green leaves from two to three inches in length. About the first of November these turn deep rich purple-red, making this plant a beautiful object at this season of the year. Altogether, *Prunus subhirtella* is one of the hardiest and most promising of the small trees recently introduced into our gardens. It was figured a year ago in *The Botanical Magazine* (t. 7508) from a plant sent in 1895 by the Arnold Arboretum to the Royal Gardens at Kew.

The two native species of dwarf *Pyrus*, or Choke-berries, *Pyrus nigra* and *Pyrus arbutifolia* (see GARDEN AND FOREST, vol. iii., p. 416, f. 52), are both good garden shrubs. At this season of the year, when the former has already lost its leaves, and its fruit, although still hanging on the branches, is much shrunken, *Pyrus arbutifolia* is the more attractive plant. It is a tall, slender bush with oblong or oblanceolate leaves, abundant white flowers which open about the 1st of June, and small fruits which do not ripen until the end of October, when they become bright scarlet and remain on the branches without loss of color or brilliancy until well into the winter. The leaves turn dark red about the time the fruit becomes ripe, and at this season this is one of the most attractive of our native shrubs. The habit is not as good as that of some others, but, in spite of this drawback, *Pyrus arbutifolia* may well find a place in any garden for the beauty of its autumn colors and the winter effects produced by its fruits.

Oranges from Louisiana and from Jamaica are now in this market, and the celebrated Indian River oranges, from Florida, are seen in considerable quantity for the first time since the ruinous freeze in that state in 1895. Several carloads of high-grade Florida oranges from the section about Arcadia have been forwarded to this city during the past few days. A carload of new-crop Navel oranges is already on the way from California to New York, having been started across the continent on November 6th, and is due here ten days later. It is said to be the first carload of this fruit shipped from that state this season. Besides Messina and Malaga lemons, from the Mediterranean, new-crop lemons of choice quality are arriving from California. Twenty-six carloads of so-called deciduous fruits, from California, were sold in this city last week. Grapes constituted almost the entire bulk, the principal varieties being Flame Tokay, Muscat, Cornichon, Verdell and Black Ferrera. Delaware and Niagara grapes, from Lake Keuka and more westerly parts of New York, are passing out of season, together with Concords. Keiffer, Beurre d'Anjou, Lawrence, Vicar of Wakefield, Beurre Bosc and Seckel pears, from near-by orchards, are still fairly plentiful, the latter costing more than twice as much as any of the other sorts.

In a paper read before the last meeting of the Society for the Promotion of Agricultural Science, on The Weights of Bees and the Loads they Carry, Professor Clarence P. Gillette, of the Colorado Agricultural College, reported that in his examinations of hundreds of pollen-bearing bees he had never found one heavily laden with honey, though these usually have a little honey, as do most working bees when leaving for the field. A carefully compiled table included in Professor Gillette's paper shows that the honey-carriers return to the hive a trifle more than one-half heavier than when they leave it, but the pollen-carriers, on an average, only increase their weight about one-tenth by the load they carry. The same table demonstrates that the bees from an issuing swarm are considerably heavier than bees coming to the hive laden with

honey, proving that they take as much food as possible with them when swarming, to guard against starvation before it is possible to again gather in stores for the new home. According to this table there are in one pound, on an average, 5,578 unloaded worker bees, and for the same weight 3,532 honey-laden bees are necessary. As many as 5,060 pollen-bearing bees or 5,447 unloaded pollen-bearers are required to weigh one pound, or 5,394 idlers; 2,206 drones; 10,965 loads of honey; or 40,580 loads of pollen, this amount representing the quantity of pollen carried on both legs by the bees.

In a recent number of *The Botanical Magazine*, Sir Joseph Hooker describes and figures (t. 7522) under the name of *Wistaria Chinensis*, var. *multijuga*, the *Wistaria* with long racemes which is so commonly cultivated in Japanese gardens and which has been grown in this country for the past twenty-five or thirty years. There is considerable confusion still with regard to the names of the Asiatic species of this genus; but this question need not be discussed here, and the object of this note is merely to call attention to a beautiful hardy vine which is not as well known as it should be. It differs from the ordinary *Wistaria Chinensis* in its narrower leaflets, much longer and looser racemes of very fragrant flowers and in their lateness, as the flowers of this plant open two or three weeks later than those of *Wistaria Chinensis*. In the autumn the two species can be readily distinguished, as the leaves of *Wistaria multijuga* turn clear yellow comparatively early, while those of *Wistaria Chinensis* remain green so late that they are almost invariably destroyed by frost before changing color. *Wistaria Chinensis* is a common Japanese forest plant and is also a native of China. *Wistaria multijuga* does not appear to be indigenous in Japan, and, judging from the fact that it is much harder than *Wistaria Chinensis*, it probably came originally from northern China, and is one of those favorite garden plants of the Japanese introduced to them by the Buddhist priests. Whatever the right name for this handsome plant may be, it is evidently in every way entirely distinct from the common Japanese *Wistaria*, the plant universally cultivated in this country and Europe as *Wistaria Chinensis*.

In a paper on Thinning Fruit, recently read before the Hudson Valley Horticultural Society, Professor S. A. Beach gave an account of experiments in thinning fruit on Apple-trees. In the first experiment two heavily-fruited Baldwin trees were selected, and all the knotty, wormy and otherwise inferior fruit was picked off one of the trees, leaving but one fruit of a cluster. Of marketable fruit the thinned tree yielded nine and four-fifths per cent more first-grade, and four and one-half per cent less second-grade fruit than the unthinned tree. Six Baldwin and six Greening trees were used in the second experiment. Three trees of each kind were thinned by taking off all poor fruit and leaving the fruit on the trees at least four inches apart. The Baldwin trees which had been thinned gave twenty-six per cent less of marketable fruit, but twenty-two per cent more of it graded No. 1 than of the fruit from the unthinned Baldwins. Or, differently stated, although the unthinned trees carried above a fourth more fruit altogether, they actually each yielded one and a quarter bushels less No. 1 fruit than the thinned trees. With the Greenings this difference was even more marked, for the thinned Greening trees on an average produced two and one-quarter bushels more No. 1 fruit than the unthinned trees. Two trees of Hubbardston were used in the third test. On one tree the fruit was thinned to at least six inches apart. The thinned tree bore seventeen and four-tenths per cent more of No. 1 apples than the unthinned tree, and seventeen and one-tenth per cent less of No. 2 grade. In all these tests fewer apples dropped from the thinned trees, and their fruit was superior in quality and more highly colored, and was worth from ten to fifteen per cent more in market. The thinning and picking took about twice the time required for picking alone. The second method in these tests proved superior enough to the first to more than pay for the extra work involved; that is to say, the work paid best where it was thoroughly done. From the figures now at hand a satisfactory comparison of the second and third methods cannot be made, nor of the effect of thinning the fruit on the succeeding crop. In a season of an enormous crop, as in 1896, when many growers did not realize returns sufficient to cover the cost of packages and of picking and handling, thinning early in the season might be expected to decrease the yield of low-grade fruit and increase the amount of first grade, with a consequent advance in prices. Relieved of the drain of excessive bearing, the trees could ripen a fairly large crop of superior fruit, and better develop fruit-buds for the following year.

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Wodenethe.

THIRTY years ago Wodenethe was a name well known to all Americans who loved gardens or were interested in the progress of American horticulture. Its history dates from 1840, when Mr. Henry Winthrop Sargent, a man of wealth and leisure, bought a country house on a plateau covered with White Oaks, Hickories and flowering Dogwoods on the east bank and somewhat above the Hudson River, nearly opposite the city of Newburg, and inspired and instructed by his neighbor, A. J. Downing, then at the height of his brilliant career, began to lay out a garden. This soon became distinguished in the art which heightened the natural beauties of the spot and the distant views obtained from it, and in its collections of exotic trees, especially of conifers, in which Mr. Sargent became deeply interested. To the late editions of Downing's *Theory and Practice of Landscape-gardening*—a work still without a rival in the English language—Mr. Sargent added a supplement in which is described the making of Wodenethe and the horticultural value and prospects of many of the trees which were first tested there in the United States. Mr. Sargent died fifteen years ago, but loving hands have preserved and increased the beauties of Wodenethe, which is still unsurpassed in its broad and lovely vistas, on the one hand stretching across the Hudson teaming with commerce to the hazy outlines of distant hills, and on the other to the nearer and bolder slopes and crags of the Fishkill Mountains.

Wodenethe, however, is no longer a trial ground for new trees. The limits of the usefulness of its twenty-two acres for work of this sort were reached many years ago, but the lessons which it can teach to-day are more valuable, perhaps, than at any previous time in its history, for at Wodenethe it is now possible to form a good idea of the true ability of many exotic trees to flourish in the northern and middle states. The hot dry summers and cold winters of the Hudson River Valley, the hungry soil, strongly impregnated with lime, and excessive overcrowding, sooner or later have destroyed most of the trees planted at Wodenethe, but some remain, and a brief mention of the most important may prove instructive to those who would plant exotic trees for the benefit of posterity.

To begin with the conifers, for in these Mr. Sargent was chiefly interested, *Pinus Strobus*, the White Pine of our eastern forests, easily surpasses its companions in height and in beauty of stem and crown, although the European Larch has grown nearly as tall and is in equally good health. Of many Norway Spruces only one is in presentable condition, and this begins to show that thinness of top which in this tree is a sure indication of decrepitude. The Oriental Spruce (*Picea orientalis*), although much younger and smaller than its European relative, is still vigorous and healthy, confirming the now generally accepted belief in the permanent value of this fine tree in our climate.

Of the *Abies* which have grown to a large size the most conspicuous and best preserved is the European *Abies pectinata*, represented by a good specimen fully seventy feet in height. A specimen of *Abies Cephalonica*, although badly crowded by its neighbors in a border plantation, shows that this tree is not only hardy in this climate, but may retain its beauty longer than many of the other Silver Firs. The Caucasian *Abies Nordmanniana* appears in several specimens from forty to fifty feet in height still densely clothed with branches and perfect in form and color. The west American *Abies concolor* is represented by a number of specimens which display several of the different forms of this tree. The largest individuals, which are from forty to fifty feet in height, have already passed the period of their greatest beauty and are thin in foliage and rather unhappy in appearance. Smaller plants, including the dark-leaved California form, known in England as *Abies Lowiana*, are still perfect. *Abies nobilis* has grown slowly and not very luxuriantly; appearing to be hardy, it gives little promise of attaining a large size.

The Scotch Pines have disappeared, but a single Austrian Pine, which, judging by its size, must have been one of the first trees planted by Mr. Sargent, has escaped the ordinary fate of this tree in the United States and is still in good health. The remarkable specimen of *Pinus ponderosa* with pendant branches (see GARDEN AND FOREST, vol. i., p. 392, f. 62) has suffered from the attacks of the fungus which generally prevents the successful cultivation of this tree in the eastern states, and is reduced to a few sparse branches at the top of a naked stem, while a smaller specimen of an ordinary long-leaved form of this Pine, about thirty years planted, begins to fail in the upper branches. There is no other California Pine left in the collection, nor any Asiatic representative of the genus, although most of the Californian and many of the Indian and Japanese species were planted by Mr. Sargent.

A good blue-leaved specimen of *Picea pungens*, raised from Dr. Parry's seeds collected in Colorado in 1862, is still in excellent condition and does not show yet the unfortunate tendency of this tree to lose its lowest branches. Two specimens of the Cedar of Lebanon, showing in stunted and contorted stems the evidences of a long struggle against adverse conditions, have now commenced to grow upward, and seem destined to long life. *Cupressus Lawsoniana* appears in two or three healthy, handsome plants. *Retinosporas*, on the whole, have done well, although the summer climate at Wodenethe is too dry for them, and there are in the collection a number of good plants of *R. filifera* and of *R. pisifera aurea*. Many specimens of *Biota* in different forms show the power of the Chinese *Arbor-vitæ* to adapt itself to our climate; and small plants of *Sciadopitys* and of *Tsuga Sieboldii*, from twenty to twenty-five years old, testify to the hardiness of these Japanese trees in this climate. Of the hundreds or perhaps thousands of conifers planted by Mr. Sargent during the years of his greatest activity, when he ransacked every nursery in Europe for species and abnormal forms, those which we have mentioned are now the only ones which are conspicuous for their size and healthy condition.

The Yew family has, on the whole, done better at Wodenethe than the true conifers. A *Ginkgo* just beginning to emerge from its juvenile form promises to become a long-lived and large tree. The European Yew seems entirely

at home at Wodenethe, where there are a number of noble specimens with green and with yellow foliage in perfect health. The *Torreya*s have all disappeared, but *Cephalotaxus* is well represented by the Japanese *T. drupacea*, and by the Chinese *T. Fortunei*, which has grown into a low bushy tree of dense habit and brilliant foliage, and is now one of the most beautiful plants in the whole collection.

Of the exotic trees with deciduous leaves the most remarkable, perhaps, is a specimen of *Magnolia macrophylla*, a perfectly-balanced tree, about fifty feet high and fully fifty feet across the branches. The European Beech shows its value in our climate by large and healthy specimens of the Weeping and the Cut-leaved varieties. The yellow-flowered Buckeye (*Æsculus octandra*), a native of more southern forests, is perfectly at home at Wodenethe, as are the *Kœlreuteria*, the Yellow Wood, the European Linden (*T. platyphyllos*) and the *Gleditsia*. The form of our southern Bald Cypress (*Taxodium*), which in gardens usually passes as *Glyptostrobus pendulus*, has grown well and appears perfectly healthy, and large masses of the Chinese *Magnolias* show the permanent value of these trees in the northern states.

It has been seen that the list of exotic trees which, surviving at Wodenethe for more than forty years, have proved themselves really satisfactory there is not a long one. In the shortness of the list is to be found, however, the true significance and the real value of Mr. Sargent's dendrological experiments, which seem to show clearly that American trees are the best for America, and that the most permanent living ornaments of our parks and plantations must be sought in the American *silva*, with such foreign trees as experiments like that at Wodenethe may from time to time show to be long-lived in our climate.

MR. T. JEFFERSON COOLIDGE, of Boston, the treasurer of the Amoskeag Manufacturing Company at Manchester, New Hampshire, which is one of the largest companies of its kind in the world, calls attention, in his last report to his stockholders, for the second time to the present and increasing disposition of the Merrimac River, on which his company is largely dependent for its power, to run in the extremes of sudden freshets and very low water, caused, he believes, by the denudation of the hills and mountains about its sources. The whole question of preserving the forests in northern New Hampshire, and especially in the White Mountain region, is important and difficult. In this elevated region head many of the streams, which become the principal sources of power for mills in New Hampshire, Connecticut and Massachusetts, and their preservation would clearly benefit the manufacturing interests of New England. To its forests, too, the White Mountain region, which is the best summer sanitarium in the north-eastern states, owes its chief charm and principal attraction; and if the destruction of these forests is allowed to continue, the value of this whole region both as a source of water-supply and as a resort for summer tourists will be ruined. The people of New Hampshire might wisely follow the example set by this state and purchase the forest land covering the whole of the elevated region in the northern counties and hold it as a public forest; but the people of New Hampshire are poor, and public sentiment would hardly authorize at this time an expenditure of several million dollars for such a purpose. As a number of the streams which rise in this region flow through more than one state, the aid of the general Government might be invoked. The preservation of these forests, however, could be much more securely obtained by the intervention of private capital and the formation of a corporation to acquire and hold forest property under conditions which would insure a perpetual forest covering. The large corporations directly interested in the flow of these rivers might become stockholders in such a corporation and control its policy. The owners of summer resorts in the White Mountains who would be benefited by the preservation of these forests might find it for their interest

to subscribe to its stock, and doubtless individuals actuated by one motive or another might be willing to contribute to its success. A great forest property of this sort might, if economically managed, become fairly profitable in the future, and there is no reason to doubt that it might be made to pay small dividends almost from the beginning. The permanency of such property ought to influence investors, and the time is not far distant when certain annual returns of two or three per cent will seem attractive to conservative persons.

Notes on Cultivated Conifers.—VII.

SCIADOPITYS, which is the first genus of the *Taxodiaceæ* which we shall consider, is monotypic and remarkable in the character of its leaves which are deltoid in form, concave, minute, and simple in character, while the apparent leaves are phylloid shoots from the axils of the true leaves. The male flowers are collected in dense catkin-like heads at the ends of the branches, and the cones are erect on short lateral shoots. The genus is monotypic and endemic to Japan. Like the Ginkgo, *Sciadopitys* was for a long time known only from a few individuals cultivated in temple gardens and from a large grove on the hill in Kyushu, in the neighborhood of the ancient monastery-town of Koya. This grove was once supposed to be the original home of the species; it is more probable, however, that all these trees were planted many centuries ago. Dupont, a French engineer, found what he considered indigenous trees on Chimono and in the Province of Meno; and in this province, below Nakatsu-gawa, I found great numbers of *Sciadopitys* growing, as I thought, indigenously and sending up their narrow pyramidal heads far above the Pines and other forest trees. In a country, however, which has been densely populated for centuries, and where tree-planting has been a recognized industry for more than a thousand years, it is not always easy to determine whether what may appear to be a perfectly natural forest has not been planted. In these mountain forests of Meno the *Sciadopitys* grows with a tall, straight trunk to a height of nearly a hundred feet, and is always remarkable in its narrow compact pyramidal head of dark and lustrous foliage. This tree is so abundant here that the wood, which is nearly white and very strong and straight-grained, is a regular article of commerce, being floated down the Kisogawa in large rafts to Osaka, where it is chiefly consumed. Except in the immediate neighborhood of this Mono forest, *Sciadopitys* does not appear to be cultivated in Japan except in temple gardens, where specimens picturesque in old age, with loose habit and pendant branches, may occasionally be seen carefully protected by low stone railings.

Sciadopitys verticillata, which owes its common name of Umbrella Pine to the arrangement of the phylloid shoots near the ends of the branches after the fashion of the ribs of an umbrella, has been an inhabitant of our gardens for twenty-five or thirty years, and is perfectly hardy in the neighborhood of Boston and one of our most distinct and beautiful garden conifers. Although for several years it grows very slowly and is difficult to raise from seeds, the Umbrella Pine grows rapidly when it is once established, and at the end of twenty-five years may be expected to attain in good soil a height of eighteen or twenty feet, and for many years to retain the dense, compact pyramidal habit which is characteristic of this tree, except in very old age. There is a Japanese variety with shoots marked with yellow which is occasionally cultivated in gardens.

Of *Sequoia* and its two California species, the last remnants of a race which once abounded in the Arctic Circle and was widely spread over this continent and Europe, little need be said here. The Redwood (*Sequoia sempervirens*), the tallest of American trees, can only flourish where winters are mild and moisture abundant, and I have never seen a specimen on the Atlantic seaboard north of Charleston, South Carolina. The Big Tree, *Sequoia Wellingtonia*, is hardly more valuable for our plantations. A

small group of these trees, stunted in growth and forlorn in appearance, has lived for years at Rochester, New York, and there are a few unhappy specimens in the neighborhood of New York. The largest which I have heard of in the east is near West Chester, Pennsylvania. A few years ago a negro cut off the top for a Christmas-tree and ruined its symmetry. In favorable positions, therefore, in the middle, and possibly in the northern states, this Sequoia can sometimes be kept alive for many years, although it is only too evident that there will never be seen on this side of the continent the massive stems and dome-like heads of this crowning glory of the American forests.

Cryptomeria is another monotypic Japanese genus and is distinguished by spirally arranged heteromorphous leaves, terminal monœcious flowers and small globose cones ripening in one season, with bracts free and recurved above, and wedge-shaped obovate scales more or less deeply divided at the apex into sharply pointed lobes, each scale bearing from three to five erect, narrow-winged seeds.

Japan owes much of the beauty of its temple gardens to the *Cryptomeria*. Nowhere is there a more solemn and impressive grove of planted trees than that which surrounds the temples and tombs at Nikkō and which is almost entirely composed of the *Cryptomeria*, and nowhere is there a nobler avenue of conifers than that which leads to this last resting-place of the greatest of the Shoguns (see GARDEN AND FOREST, vol. vi., f. 66). The Sugi, as *Cryptomeria Japonica* is called in its native country, is the most generally planted timber-tree of the Empire and its wood is more generally used than that of any other conifer. It is one of the commonest trees in all temple gardens and in many roadside plantations, and sometimes rises to the height of one hundred and twenty-five feet, with a tall trunk tapering abruptly from a broad base, covered with bright cinnamon-red bark and crowned with an irregular conical dark green head; and in beauty and majesty of port has no rival except in the Sequoias of California. The wood of the Sugi is coarse-grained, with thick layers of annual growth, dark red heartwood and thick pale sapwood: Easily worked and strong and durable, it is employed in all sorts of construction. The bark, which is always carefully preserved when the trees are cut, is used to cover the roofs of houses. A bunch of the branchlets hung over a door indicates that Saké is sold within.

Cryptomeria Japonica does not really thrive in Europe or in the United States, and although it was first sent to Europe more than fifty years ago I have never seen a promising specimen of this tree outside of Japan. It is fairly hardy even in the neighborhood of Boston in sheltered and well-protected positions, but never looks truly happy in regions which might be supposed to be much better suited to it than eastern Massachusetts, like the south Atlantic states, southern England, and the Italian lakes, a district where nearly all conifers grow more freely probably than in any other part of Europe.

There are a number of forms of *Cryptomeria Japonica* of Japanese origin in cultivation. The most distinct of these (var. *elegans*) is a form with scattered spreading leaves which during the spring and summer are bright green and in the autumn become red-bronze color. It is a small compact tree furnished with short horizontal branches and pendulous branchlets, and is less hardy here than the ordinary form. *Cryptomeria Japonica Lobbi* is rather more compact in habit than the ordinary *Cryptomeria Japonica*; the branches are less pendulous and the foliage rather darker green. It is said to have reached Europe from the Botanic Garden at Buitenzorg, to which it had been sent by Siebold from Japan. *Cryptomeria Japonica nana* is a small bushy shrub rarely exceeding two feet in height, and in *Cryptomeria Japonica spiralis* the leaves are closely appressed against the branches. There is a form (var. *argentea*) in which the young growth is silvery white.

Taxodium, the Bald Cypress, which was once common and widely distributed in the Arctic Circle, and during Miocene and Pliocene times was spread over the interior

of this continent, and over Europe and north-eastern Siberia, has now become reduced to one or possibly two species confined to the southern United States and Mexico. The genus is distinguished by its paniced male flowers; by the form of the spirally disposed cone-scales, which are abruptly dilated from slender stipes into irregular four-sided thin discs conspicuously marked when half-grown with the reflexed tips of the flower-scales, and at maturity are often mucronulate; by its three-winged seeds, deciduous, dimorphous foliage, and by the remarkably woody projections, the so-called Cypress knees, which rise from the roots to above the surface of the shallow water in which this tree grows to its greatest perfection.

The pride of our southern coast forests, and one of the largest and most valuable timber-trees in the world, *Taxodium distichum*, in spite of its semiaquatic habit and southern home, has proved a first-rate park and garden tree, showing the vigor of its constitution in its ability to flourish when transplanted to dry ground in climates of severe winter cold and summer drought, like that of eastern Massachusetts, where several specimens have been growing for seventy or eighty years. Up to the present time, however, the Bald Cypress has retained in cultivation its rather formal pyramidal habit, and I have never seen a cultivated tree which showed any indication of assuming the mature form with low, broad, flat crown of wide-spreading branches which distinguishes this tree in its native river swamps, and which, raised high above dark waters on its stately buttressed trunk, makes it one of the most majestic and impressive trees of our forests. There is a form of the Bald Cypress in gardens with pendulous branches (var. *pendula*) which is a distinct and handsome plant, and European nurserymen propagate dwarf forms and others of more or less abnormal habit.

The tree which in the United States and Europe is almost universally called *Glyptostrobus pendulus*, is really a juvenile form of the *Taxodium* of the southern states, *Glyptostrobus*, being a south China genus with a single species, which has possibly never been brought to the United States, and which would not be hardy in this part of the country. In this form the slender branchlets, which are pendulous or erect, are often six or seven inches in length, and are covered with closely appressed acicular leaves, and no one unfamiliar with the fact that normal branchlets with distichous leaves sometimes appear would imagine that it was a form of the Bald Cypress. This acerose form is not uncommon in South Carolina, in northern Florida and in the neighborhood of Mobile, Alabama. It is a comparatively small tree in its native swamps, and, in spite of its southern home, is hardy in New England, where it is one of the most distinct and beautiful of the pyramidal conifers. The proper name for this tree is *Taxodium distichum*, var. *imbricarium*.

The Mexican Bald Cypress, *Taxodium mucronulatum*, which was first distinguished from the tree of the southern states by an Italian botanist who studied a cultivated plant in the Botanic Garden at Naples, is possibly a distinct species, although when more thoroughly known it may prove to be a mere geographical form of our tree. It is chiefly known from a few very large and venerable individuals which have filled travelers in Mexico with admiration since the time of the Spanish conquest. The largest of these trees of which authentic measurements are recorded stands in the town of Tule, on the road from Ozaca to Guatemala. A portrait of this tree was published on page 125 of the current volume of GARDEN AND FOREST (fig. 15); in the third volume (fig. 28) is a portrait of the Cypress of Montezuma, which is the largest of the Cypress-trees in the gardens of Chepultepec. This was a noted tree four centuries ago, and is 170 feet high, with a trunk from forty to nearly fifty feet in circumference. It is believed to be at least 700 years old.

The Abietinæ as garden plants, beginning in the next issue with *Pinus*, will be discussed in the remaining numbers of these notes. C. S. S.

Horticultural Tombstones.

ONE of the pictures which lingers in my mind after a visit in northern Pennsylvania during the past summer is that of an old Pear-tree standing alone in a meadow. Its top was partially dead, and the rest of the tree was fighting a losing battle with that dreaded enemy of the Pear, fire-blight. There is, perhaps, nothing peculiarly worthy of note in such a picture as this, but the tree presents the last vestige of an unwritten history. It is a relic of one of those visionary ventures which so often end in disappointment and loss. Here, in times past, lived a farmer, who was something of a character in his way. This is but one of the fading traces which tell of ventures in different lines. On the stream just above are still to be seen evidences of an old milldam, which supplied the motive power for a sawmill in the olden days. This in itself might well serve as a basis for moralizing, for here, where once the waiting logs and piles of lumber told of many days of slow but steady work, the denuded hills now look down upon a stream robbed of its strength, except as manifested in an occasional fit of frenzy in which it far surpasses its old-time vigor, only to quickly relapse again into a lifeless condition and sometimes even entirely to disappear.

A short distance below the old milldam starts a now dry and grass-covered race which led the water to another and a smaller dam where a horizontal wheel with a tall and upright shaft furnished the power to run a stave-saw, a drag-saw for sawing wood, and perhaps one or two other small pieces of machinery. The building with which these were connected was primarily a cooper shop. From the opposite side of the old milldam a small overshot wheel, ingeniously connected with wires which played back and forth, did the churning at the house some fifty rods away.

A little way from the milldam, in the same field with the Pear-tree, is the site of an abandoned oil-well, which was expected to make the owner of the farm wealthy and to furnish the inhabitants of the community with unstinted light, but which, unfortunately, only gave out in the morning the oil which had been poured in at night by others while the owner slept. All these are within a quarter of a mile of each other. Across the highway, on the same farm, may be seen the traces of an old brick kiln, which evidently met the same fate as the other ventures, perhaps even before they had their birth. Yet primarily this man was a farmer and made the business pay, leaving his farm and home intact when, as an old man, he passed away.

But the epitaph upon the Pear-tree is the one I wish to interpret. Here, in days gone, was something of a Pear orchard, of which this tree is the lone survivor. In the height of its glory the orchard covered something like an acre of ground. If memory serves me rightly, most of the trees were dwarfs, but my earliest recollection only recalls the orchard as badly thinned by blight and other fatal enemies. At one end of the fenced-in field was a clump of Lawton Blackberries, which served mainly as a temptation and a vexation to the barefoot boy who passed that way.

Doubtless the owner of this orchard had read or heard of the success of some trained fruit grower with Pears, and had visions of success for himself which were never realized. Any one familiar with country life can call to mind numerous examples of a similar sort, and the same characteristic of human nature manifests itself just as frequently, though in slightly different ways, in commercial life. The broadest lesson to be derived from it is a lesson on the frailty of human judgment, but the lesson of most interest to the horticulturist is the lesson of changed conditions. There may have been a time when such a venture would have paid in a favorable locality, but if so, that time has long since passed. The successful and thrifty farmer of the olden time was the one who could most nearly provide for all his wants in the products of his own farm. He not only produced the meat, the grain, the vegetables, the fruits and the condiments which furnished the food for his family,

but also the wool and the flax which were to provide the clothing, these in turn being fitted and transformed into the form in which they were needed without the aid of capitalist, factory or employee, as we now understand these terms. Gradually this field of production has been narrowing. Another and another of the comforts and luxuries of life have been found to be more conveniently and cheaply furnished from an outside source. Sometimes even yet the farmer most commended is the one who has some minor product to count upon which can be exchanged for things he wishes to purchase. Yet this method is just as certainly and as surely passing out of date as has the primitive one of producing everything at home. Whether wisely or not is open to argument, but to fight against it is only to fight the incoming tide of the world's progress. The cost of production must be reduced to a lower point than can be done in the cultivation of a little of one crop or another by a man who has no special knowledge of the needs of the crop and no special facilities or conditions in its favor.

Granting that the farmer already referred to knew how or could have learned how to grow Pears as well as any one else, his three-quarters of an acre could not be a success to-day. The supply would be too great for the local village market and too small to be profitably placed in a large market. The cost of seeking a buyer, of packing and of shipping would all be far greater in proportion than with a larger product, while the amount would be too small to attract any attention from buyers. Yet the most important reason of all doubtless lies in the fact that the man must be trained for his work. This law is just as inevitable in horticulture as in commerce or professional life. Success in any line demands study and a complete mastery of details. This the man who attempts to produce a multitude of things cannot acquire. This old Pear orchard has failed and passed into oblivion, not from any lack of adaptability of the Pear to that locality, for Pear-trees in the vicinity are loaded with fruit year after year, and seldom fail to fruit from any cause. But because it was a venture not backed up by the knowledge and training which could have made it succeed.

University of Nebraska, Lincoln, Neb.

Fred W. Card.

New or Little-known Plants.

Hypericum lobocarpum.

TWO weeks ago we published a figure of *Hypericum galioides*, a plant which is now well established in our gardens, and on page 453 of the present issue appears a figure of a less well-known species, *Hypericum lobocarpum*, still to be introduced into cultivation.

*Hypericum lobocarpum** is described as a shrub with upright stems from five to seven feet in height, linear-lanceolate or narrow oblong leaves from one to three inches in length, numerous flowers, somewhat smaller than those of *Hypericum densiflorum*, and stoutly beaked five-celled, deeply five-lobed fruits, the carpels being nearly distinct and falling away separately from the central axis.

Hypericum lobocarpum inhabits Oak barrens of middle and western Tennessee, western Mississippi and southern Louisiana, and, judging by other species of this genus from the same general region, may be expected to prove hardy in northern gardens.

CRATÆGUS CORDATA.—Fifty years ago this so-called Washington Thorn was more frequently seen in our gardens than it is to-day, although it is one of the most beautiful of the hardy small trees available for our plantations. It is very hardy; it flowers later than the other species and its flowers are produced in great profusion. These are followed by small showy orange-colored fruits, which hang on the branches until winter, and in November, after the foliage of most native plants has fallen, the lustrous leaves

*Coulter, *Gray Syn. Fl. N. Am.*, i., pt. I., 285 (x897).

Fig. 57.—*Hypericum lobocarpum*.—See page 452.

1. Portion of a plant, natural size. 2. Fruit, natural size. 3. Cross-section of a fruit, enlarged.

turn bright orange-color and make a delightful contrast with the darker fruits. This is such a clean, hardy, well-behaved plant and so entirely free from the attacks of insects and fungal diseases that it ought to be one of the

most popular of our native trees for general park planting. Hardly less beautiful at this season of the year is *Crataegus viridis*. This is one of the largest of the American Hawthorns, and a southern species. It has, however, proved

Hardy in the Arnold Arboretum, where there are now a number of large plants which during the first week of November were brilliant with their orange and scarlet foliage and small bright red fruits.

CRATÆGUS CARRIERI.—Two years ago we called attention (vol. viii., p. 495) to the beauty of the fruit of this tree. It is valuable, too, for the splendid orange and scarlet tints of its leaves, which make a delightful contrast at this season with the large oblong bright scarlet, lustrous haws, which hang on the branches long after the leaves fall and well into the winter. This interesting tree originated in the Jardin des Plantes in Paris, where it was raised, it has been said, from a seed of *Cratægus Mexicana*. More probably it is a hybrid of *Cratægus Crus-Galli*, which it resembles in many characters, and of some species not easily determined. Whatever its origin may have been, however, this is a perfectly hardy tree of good habit, and in the autumn it is unsurpassed in beauty of foliage and fruit. Altogether, it is one of the most desirable of the whole genus for the north, and a plant of first-rate merit.

TWO CHINESE TREES.—Two little-known north China plants in the Arnold Arboretum were conspicuous during the first week in November from the brilliant coloring of their leaves. The Chinese variety of the Mountain Ash, the *Sorbus discolor* of Maximowicz, retains its leaves much longer than any other Mountain Ash in our gardens, and, unlike those of the other species, the leaves turn deep dark purple-red before falling, making it a distinct and very attractive autumn plant. *Cratægus pinnatifida*, sometimes cultivated in China for its edible fruit and distinguished by its deeply divided leaves, is conspicuous in the autumn from the brilliant orange and scarlet tints of its foliage. A perfectly hardy small tree, this promises to be an important addition to plants of this class.

Cultural Department.

Chrysanthemum Novelties of 1897.

THE best very early white Chrysanthemum for commercial purposes I have ever seen is Midge. The plant is but twelve to fifteen inches high, needs no staking, and makes an ideal pot-plant. The foliage is beautiful in form and is carried down to the base and well up to the flower. The leaves are dark green, almost black, and make a bold contrast with the pure white flowers of the snowball type. Flowers were ready to cut October 4th, and some of the first flowers are still crisp and altogether salable. Midge is claimed by the introducer to be a fuller flower and better in every way than the flowers of Madame F. Bergmann. This is an important claim, for there is no early variety about which there is such general agreement as Madame F. Bergmann, except among the yellows, where Marion Henderson is the general favorite. We have not grown Madame F. Bergmann this year under the same conditions as we have grown Midge, but in dwarfness, fullness and keeping qualities we believe Midge is superior. On the whole, Midge is the greatest improvement of the year.

A second early white of the same snowball type, and a worthy successor of Midge, is the new variety, George S. Kalb. Like Midge, the flowers are only medium-sized, but this is no objection, as they are too early for the shows, and large flowers are not so necessary by October 10th. This variety also gives a succession of flowers, some of which are salable as late as November 10th, and there seems to be no reason why it should not produce ten flowers as well as four.

I see no improvement in the midseason white Chrysanthemums. Western King with us is distinctly inferior to Mrs. Henry Robinson. The numerous late varieties are commonplace, except Mrs. Martin A. Ryerson; this promises to be a worthy predecessor of Yanoma, which ends the succession of whites.

The yellow varieties have not advanced at all. There is nothing equal to last year's Modesto, Duchess of York, W. S. Devis, Mrs. C. B. Freeman, or Buff Globe, all of which represent different types. Sunstone, however, is entirely perfect within its limitations of color, and may be safely commended to those who do not appreciate the fading out of Philadelphia. Maud Adams is an unusual type, if not a wholly new one, but its strange, stiff, tubular florets, with their indescribable form and carriage, mark it as a curiosity for fanciers. It is not a

variety like Modesto, which amateur and professional cultivators would both wish to grow, and which is suitable for exhibition, for cut flowers and for pot-culture. Indeed, it rarely occurs that a variety is suitable for all these purposes. Such an exception, however, is Casco, which seems to be a decided improvement among the dark sorts. Although it is properly classed with Chrysanthemums in the early section, it lasts well through the midseason. It belongs to that large group called by the English Amaranths. The reverse of the florets in these sorts is always lighter than the face, sometimes bright and silvery, often dull neutral shades, evidently derived from the face, as though they were stained through. The dull reverse is the chief feature of Casco, but the florets are relaxed enough to give a suggestion of the rich garnet within. Leonidas is a large flower of the Amaranth class. It is early and long-keeping, with a bold and rugged, almost bristling, form. This, too, is a decided advance.

I see no improvement among the bronzes or reds except in Loantika, which might be classed in either group. It resembles Pluto, which is by far the best red with a yellow reverse we have yet seen, not even excepting Charles Davis, which still seems to be the commercial favorite. Loantika is an early sort, and ends just as Pluto is well started on its interesting and daily changing development. There is no late variety yet to complete this succession.

The pink sorts have received two notable additions this season. There has never been as satisfactory an early pink variety as is Marion Henderson among the yellow-flowering kinds. Last year a superior pink Chrysanthemum seemed to be attained in Glory of the Pacific, although the variety with us was an utter failure, being so far "off character" as to be practically not true to name. Elvena is the best early light pink of its form we have seen, and lasted seventeen days before the yellow disc appeared, and ended its salable condition. There is no improvement in the midseason pinks, Mrs. Perrin and Madame Felix Perrin of last year (these are practically the same) being the best rosy pink varieties yet attained for all-around use, though still far from ideal as regards evenness of color. Several others advertised as pink are capital whites, but fourteen out of thirty-one varieties grown under the same, and otherwise successful, conditions have shown only a trace of pink at most. Merula might be classed among the light pinks. It is badly lined at first, but at its best the mass effect is dainty in color and loose in form, although very dense and full and round like Ophir and others which are close to the Chinese type, but not quite regular and formal enough to be included by the English in their Incurved section.

Among the less familiar sections, such as the large-flowered varieties and the Japanese Anemones, I see no improvement; but there is one single variety, Mizpah, worth serious consideration. This is a plant from twelve to fifteen inches high, ideal for pot-culture. A plant of this variety, with eighty or more crimson flowers, proved one of the greatest attractions to our visitors. It probably originated from *C. frutescens*, the same species to which the Paris Daisy or Marguerite belongs, but may be used as a rough illustration of the long way our cultivated Japanese Chrysanthemums have come from a primitive form. Mizpah has two or three series of rays, but is single in effect. Of course, the florets have not the brilliant color and velvety finish of a Cineraria, but for artistic decorative work the general effect is quite as good at this time of year. The only drawback to Mizpah is the fading of the color to a pinkish hue, when the yellow disc becomes inharmonious unless the flowers are picked off.

This view of the American novelties is fairly complete, as we have grown under the same conditions all but ten of the sixty-five varieties of American origin first described in the catalogues of 1897. The American introductions are not so numerous as the importations, but it is impossible to say when a variety of European, Australian or Japanese origin becomes a novelty in America, and it is impossible to grow them all. The Californian novelties are not considered in this account, as California is practically a foreign country to the eastern states in the matter of novelties. Judging by the thirty seedlings sent to the Cornell Experiment Station in advance of the trade, there is more of promise in 1898 than in 1897 for advances in American novelties.

Ithaca, N. Y.

Wilhelm Miller.

Nægeliæ.

NOW that the frost has killed everything I had out-of-doors except a few Kniphofias, I must look for solace to such things as are under glass. This is not a season for abundance of greenhouse flowers for one who grows no Chrysanthemums, yet I have a few plants which I now enjoy.

Last spring I sent an order to Holland for one hundred *Nægeli*as in five kinds, but the nurseryman through some mistake sent me fifty kinds, and I have had great pleasure in watching their growth and blooming. The first one began to blossom in August and has sent up spike after spike, and is now, after two months, at the end of October, covered with flowers. These plants are ornamental in foliage as well as in flower. The leaves are nearly heart-shaped, toothed on the edges and of an almost fleshy substance, but their beauty consists in their plush-like service. Some are bright green, some have a green ground with broad black, brown or red veins; some have broad patches of crimson on a yellow ground, some are olive with edges of green and crimson, with black veins; but it is impossible to describe the variously colored leaves so as to give a clear idea of them, as no two varieties are exactly alike. These colors are mostly due to a covering of short hairs distributed over nearly all of the upper surface.

The flowers are as varied as the foliage. Nearly all have throats of white or yellow or both thickly or sparsely dotted with brown, crimson or pink. In some cases there is a broad margin of rose or pink or crimson; in some cases the color of the throat, yellow or white, shades insensibly into these other colors; sometimes the flowers are of a pure, unspotted yellow, bluish or white. They are also of elegant shape and are thrown well above the foliage in pyramidal spikes.

The *Nægeli*as are not inclined to dry off of themselves, and I usually cut them off at the ground at the end of November, however fresh they may seem at the time; for, while the rhizomes may, perhaps, not need rest, they are not hurt by being compelled to take it, nor could they well be divided if kept growing; moreover, if the pots containing them can be put away under the bench for three months we gain room for other things at a time when space is scanty under glass. The cultivation of *Nægeli*as is very simple; the rhizomes are much like those of *Achimenes*; that is, they consist of fleshy scales set along on all sides of a central fibre. They are more loosely strung than those of *Achimenes*, being intermediate between these and *Tydas*; they are also very much larger, attaining sometimes the size of a man's thumb. They should be planted in March in rich and reasonably light soil in five-inch pots. One in a pot is enough, and I prefer to lay them on their sides with the tip, the growing point, in the centre. Of course, very little moisture is needed until they begin to grow.

Canton, Mass.

W. E. Endicott.

Honor Bright Tomato.

THIS seems to me one of the most distinct varieties of Tomato yet introduced. The vine, though strong-growing and vigorous, with large leaves, is a peculiar yellowish green color, quite noticeable even in the cotyledons. It is very productive, bearing its fruit in large clusters. It comes into blossom and develops full-sized fruit as early as any of the forty sorts with which I have compared it, but it was the latest of all to ripen its fruit. All tomatoes turn a lighter green as they begin to ripen, but the fruits of this variety become so light as to justify one in calling them white. They then gradually turn yellow, which color, though in a lighter shade, covers the fruit as completely as it does on the fruit of Golden Queen, though at this stage there are darker spots about the stems. A faint blush then appears, which deepens and spreads until the whole fruit, when fully ripe, is a rich but rather light red. This ripening process and change of color takes place very slowly, much more so than in any other variety, as I have already suggested. Early in the season I thought this sort would compete with the Atlantic Prize in earliness, yet it was the last of all varieties to furnish ripe fruit, and perfected only the smallest portion of its crop before frost. The fruit is a little above medium size, nearly round, with no distinct sutures, and very uniform and symmetrical in shape. The flesh is very solid even when fully ripe, quite dry, and there is comparatively little pulp about the fairly abundant seeds. The skin, though thin, is very hard and firm. The flavor is fair, and would be specially pleasing to some because it is so mild, but it lacks, even in fruit ripened on the vine, the sprightly vinous flavor which is to me the great charm of tomatoes. That which distinguishes this sort from all others is its slow-ripening habit. This quality, united with its solidity, may make this variety one of the greatest value. It is said that fruit can be picked when yellow, packed in barrels and sent long distances, as to Europe, and will be in ripened and good condition on arrival at its destination. I can readily believe this possible, for I placed some yellow fruit in the cellar and some on the shelves of a greenhouse, and

found them of beautiful color and fair quality twenty-one to twenty-eight days afterward. I wish the quality of the fruit was more to my personal taste, but in Honor Bright we certainly have an entirely new type of tomato, and one which, if it does not itself prove to be of practical value, is certain to lead to the introduction of sorts that will,

Detroit, Mich.

Will. W. Tracy.

Correspondence.

Contrasts in an Old Garden.

To the Editor of GARDEN AND FOREST:

Sir,—A garden developed through the care of a hundred summers and prized for the tender associations of a long lifetime, comes to wear a marked individuality of its own, and it is not strange if it enforces with somewhat commanding power its special object lesson in the art of gardening. In one of these old gardens lately seen the value of effective contrast was strikingly displayed. Age has almost closed the ears of the owner to outer dissonances. Her bees and her flowers live together in harmony and peace, and among them her hours run on happily while she delights in showing her favorites and telling their little histories. "I always put my *Salvias* here between the white flowers," she commented, when I exclaimed at the sight of a great blaze of scarlet between huge segregated clumps of Day Lilies and a thick row of the tall white perennial Phlox. There were trees behind, sun and shade mingled, and the simple, dazzling contrast of the pure color with the lilies, and the great soft heads of white phlox, both set off by abundant green, was charming. The garden proper lay beyond, enclosed within wire netting. It is the garden of a farmer's wife, and "father," a white-haired, silent man, stiff with labor, loves "mother's" flowers almost as well as she does herself, and is sure that she has a genius for growing them. The season through it is plain that an eye for color has guided the whole arrangement of the place. It was shown in spring when the great Dogwood flowered, and its high, alluring masses of picturesque bloom were set against the dark old Cedar-tree behind it; when the Trumpet Creeper above and the Tiger Lilies below flared and mellowed along the gray wall of the "back sheds"; when the Wistaria and the Baltimore Belle were both rioting in their glory. At all times a refined contrast served to emphasize in a surprising degree this plain old homestead, with its large, rambling buildings, its variety and amplitude of leafy shade and coolness, and the compact and crowded flower-garden which has overflowed to form borders and colonies in every available corner of the big "dooryard." There is nothing formal, nothing ambitious, yet here is a place where many a professional gardener might take lessons in combining with true skill the elements of his art.

The importance of contrast in a garden compares with what the artists call "values" in a picture. The wonderful variations of color and form caused by light and shade are not generally recognized by the untrained eye, yet as the art student is bidden again and again to discern this quality he finds by a gradual dawn of perception that this is indeed a kind of mystery where the invisible becomes visible through concentrated attention. In painting, all good coloring to be harmonious and beautiful must first be true, and rest upon this basis of a faithful adjustment to the comparative force of light. The common light of day, prosaic as we find it through custom, and, indeed, unnoticed, is still an ever-present marvel of infinitude and perfection. "Of course, snow is almost never white," a landscape-painter once said to me, "it is usually yellow in the sun and blue in the shade, sometimes quite a deep purple." This will sound like nonsense to many, yet observation shows that it is true.

If juxtaposition does not actually change colors, as the magic of strong sunlight seems able to do, it has a vast effect upon the whole impression. It is not enough to avoid the contrast of colors that "kill" one another. A constant gain by means of reciprocal effect is the thing to be sought, and it will bear long study. With my friend in beautifying her old garden, it has been, apparently, instinctive. An unconscious impulse surely gathered together all the soft rosy shades of the Sweet-Pea hedge, for which the wire netting is utilized, and the big bed of Sweet Williams close by, with wave-like fringes and billows of white Petunias extending to the more pronounced tints of the summer Carnations. On the other side the background is of Zinnias; then, solidly massed, Coreopsis and many Marigolds in gold and lemon colors. Nasturtiums in all their warmth of lavish reds and yellows make a great tent-like screen around a rustic seat. A fine bed of perennial Lark-

spurs is near enough to give all the force of contrast to its unrivaled blue. Cornflowers and a hundred other pretty annuals are scattered wherever there is room, with many a cushion of fragrant Mignonette or Sweet Alyssum interspersed; and the bunches of cut flowers that these borders supply are always as fragrant as they are profuse.

One secret of the perfection of this rare old garden is the fearless use of the wheelbarrow. With all the gentleness that seems to belong inevitably to the lover of flowers, its owner is gifted with the strong trait of decision. Annuals, perennials, cuttings multiply everywhere, and there are always, one would say, too many plants, though all seem to thrive, but nothing is allowed to keep a position where it carries itself insolently as an intruder. If a weed is a plant out of place, how many weeds there are assiduously cultivated in some very showy gardens. Homely as are her ways, perhaps, "mother" has really a genius for her own task. She certainly knows how to make a garden that is a complete and beautiful whole, and not a mere collection of more or less interesting plants.

Amherst, Mass.

D. H. R. Goodale.

Experiences in Fertilizing Potted Plants with Wagner's Solution.

To the Editor of GARDEN AND FOREST:

Sir,—In 1894 I made notes regarding the use of this form of plant-food upon rooted cuttings of several species of common house-plants. The solution has been tested quite extensively by Professor Paul Wagner, Director of the Agricultural Experiment Station at Darmstadt, and the results of his trials are embodied in an illustrated pamphlet of sixty-seven pages, entitled, *Die Anwendung Künstlicher Düngemittel im Obst- und Gemüsebau, in der Blumen- und Gartenkultur*, the third edition of which was published by Paul Parey, Berlin, 1893. The solution contains phosphate of ammonia, thirty grams; nitrate of soda, twenty-five grams; nitrate of potash, twenty-five grams; sulphate of ammonia, twenty grams. Add water to make 100 liters, or about twenty-six and a half gallons.

We used in our experiments *Pelargonium* (*Geranium*), var. *Luster*, six plants; *Begonia compta*, six plants; *Heliotrope*, twelve plants. Several other plants, including *Carnations* and *Cinerarias*, were treated with the solution.

At first the plant-food in solution was given to the rooted cuttings which had just been potted; but the plants began to drop their leaves and show signs of unthriftiness, and the solution was withheld for three weeks. They had then recovered, and were making a good growth. Lot No. 1 comprised two plants each of *Begonia* and *Pelargonium* and four of *Heliotrope*; these were potted in rich soil made by composting good turf with about one-third its bulk of stable manure. These plants received no additional plant-food. Lot No. 2 consisted of the same number of plants as lot No. 1. These were potted in the same kind of soil and watered with the solution, and lot No. 3 contained the same number of the same varieties of plants as lots Nos. 1 and 2. These plants were potted in a soil of anthracite coal ashes, to which five per cent (by weight) of moss-peat had been admixed. These plants were watered with the solution.

Beginning September 18th, the solution was administered whenever the plants needed watering, with the exception of the plants in lot No. 1, which received water instead of the solution. The plants in lot No. 2 soon began to grow, and were the largest of all. One plant in lot No. 3 decayed at the stem and roots, and was removed. The plants were repotted December 1st. Those in lot No. 1 had good roots, while those in lot No. 2, which had much larger tops, had a root-system much smaller, and those of lot No. 3 had almost no roots. This was true of the several species as well as of the individual plants grown under this treatment. The *Carnations* seemed to be injured instead of benefited by so much plant-food, the largest plants being those grown in the soil alone. *Heliotrope* plants grew as well in the coal ashes as in the soil when both received the solution. The smallest plants were those of lot No. 1, which received no liquid fertilizer. *Pelargoniums* and *Begonias* grew best in the compost with the solution, but the plants in lot No. 3, for the most part, were smaller than those of No. 1.

About the first of January, 1895, some of the highly-fed *Pelargoniums* began to wilt, and the wilting continued even when the soil was saturated with moisture; the point had been reached, evidently, where the small root system was unable to supply moisture as fast as it was given off by the leaves. As soon as it was apparent that the plants could not recover under

the same treatment they were removed from the pots and the soil was carefully washed from the roots. The plants were then severely cut back, potted in ordinary soil, and they recovered.

The results of these tests point to the conclusion that while the amount of moisture in the soil influences the development of the root system as explained by Sachs,* the amount of easily available nutritive matter in the soil also exerts a considerable influence upon the size of the root system. The overfeeding of plants is said to cause a decay of the root-hairs which are quickly replaced by new ones; probably this is what happened in the case cited above. The symptoms, however, were not those stated by Sorauer, who says:† "The case becomes more serious if the concentration of the water contained in the pot becomes too strong, owing to a too rapidly repeated application of manures. The growth of the upper portions of the plant is then visibly retarded, the internodes are shortened, and the leaves become puckered, owing to a shortening of the midrib and lateral veins, or are bent in various directions, spotted, and fall off at an early period. The roots themselves are short, thick and bent up, and the newly formed root-hairs are irregular and shortened, soon become brown and discolored and die away."

In this experiment the plants had every appearance of thrift until they were found in a wilted condition. A superabundance of easily soluble and, therefore, easily available plant-food enables the plant to take up the required amount without sending out long roots to search for it. Large conducting roots are unnecessary, the root-hairs near the stem being able to take up all the plant-food that can be assimilated by the plant.

Since making the cultures described above we have constantly used the same solution, but applied it less frequently, with excellent results. One application a week for the slower-growing and woody plants, and two applications for the more rapid-growing herbaceous plants, seem to be all that is needed. This method of feeding potted plants is much neater than the use of liquid manure; it often renders repotting unnecessary, and is cheaper than the proprietary forms of prepared liquid plant-food usually found upon the market.

Agl. Exp. Station, New Haven, Conn.

W. E. Britton.

The Forest.

Are the Trees Receding from the Nebraska Plains?‡

IT is a question of no little interest, both botanically and economically, whether the forest trees upon the Nebraska plains are receding from a former wider distribution.§ I do not here refer to such changes in distribution as are made by man, who in some places is removing the forest trees, and in others planting and growing them. These changes, which are directly due to man's interference, are of greater interest in other portions of the country, but upon the plains another question appears, involving the slow changes due to natural causes, and having nothing whatever to do with men's activities.

There are, all told, sixty-five species of trees which grow naturally within the limit of the state, yet for a great part of its area but a small per cent of these are to be found in any particular locality. The greatest number occurs in the south-eastern corner of the state, and from this point the species decrease as we pass north-westerly. To particularize, as we enter the state at its south-eastern corner we find that there are ten species of Oaks, but after traveling one hundred kilometres (sixty to sixty-five miles) westward or north-westward we find that there are but two species, and within a few kilometres (five to ten miles) one of these disappears, unless we follow the bluffs of the Missouri northward. The trees of the Walnut family present a similar interesting distribution. The Black Walnut has extended its range along the south line of the state, in the Republican valley, for 350 kilometres (200 to 220 miles), and northward along the Missouri and Niobrara rivers for fully 700 kilometres (435 miles). The Butternut, on the contrary, does not extend more than 100 to 125 kilometres

* *Physiology of Plants*, p. 256.

† *A Treatise on the Physiology of Plants*, p. 73.

‡ A paper read before the botanical section of the American Association for the Advancement of Science, in Detroit, August 10th, 1897.

§ GARDEN AND FOREST, vol. v., p. 46. Vol. vii., p. 509.

(sixty to seventy-five miles) from its point of entrance. The Shellbark, the Big Hickory-nut and the Pig-nut have little, if any, greater range than the Butternut. So if we take up almost any of the species they are found to have entered the state from the south-east and to have passed northward and westward to greater or less distances. There are, however, a few species (nine in all) which seem to have entered from the west. One is the Buffalo Berry, *Shepherdia argentea*, which is scarcely entitled to be called a tree, since it rarely attains to either the form or dimensions of one; it has, however, succeeded in traveling further than any other of the western arboreal species, reaching the Missouri River on the east and the Republican on the south. The next in extent of distribution is the Yellow or Bull Pine, which enters the state at two points and stretches eastward for long distances. Near the north-western corner of the state, Pine Ridge, with an elevation of 1,500 metres (4,600 feet), extends eastward from the Wyoming Mountains, and after about 150 kilometres (ninety miles) passing over the line into South Dakota. On this elevated ridge, which is quite mountainous in many places, the Yellow or Bull Pine is found in abundance, and it has passed from the ridge to the abrupt and rocky bluffs of the Niobrara River, down which it has extended to within less than 100 kilometres (sixty miles) of the river's mouth. About 125 kilometres (seventy-five miles) south of Pine Ridge is a similar but higher uplift of land, Cheyenne Ridge, which extends eastward between the North Platte and the Lodge Pole rivers for a distance of nearly 200 kilometres (125 miles). Its highest points, known locally as the Wild Cat Mountains, attain an elevation of about 1,700 metres (5,300 feet), and from these the ridge descends gradually to 1,200 metres (3,700 feet) at its eastern extremity. Upon this extended ridge this Pine has extended for at least 150 kilometres (ninety miles). It is found also in widely isolated cañons in the central part of the state, near the eastern border of the great Sand-hill belt.

The other trees which have invaded the state from the west have followed one or the other of these two ridges. Thus, the Quaking Aspen (*Populus tremuloides*), Black Cottonwood (*Populus angustifolia*), Mountain Maple (*Acer glabrum*) and Cañon Birch (*Betula occidentalis*) follow Pine Ridge for from fifteen to 125 kilometres (ten to seventy-five miles). On Cheyenne Ridge Rydberg's Cottonwood (*Populus acuminata*) has pushed in from the Wyoming foot-hills for a distance of from fifteen to twenty-five kilometres (ten to fifteen miles). It is interesting to mention here that the very pretty smaller Mountain Mahogany (*Cercocarpus parvifolius*), which further south-west becomes a small tree, enters the state on Cheyenne Ridge, where it grows luxuriantly as a rather tall-spreading shrub on the precipitous slopes of the Wild Cat Mountains.

Looking over the whole area, and studying attentively the condition of the trees along the borders of the areas which they occupy, we may ask whether they are advancing or retreating. At one time I held the view that the eastern trees were advancing and the western retreating, but further examination has somewhat modified this view. Along the western border of the area occupied by the Bur Oak (*Quercus macrocarpa*) the trees are found upon the sides of the narrow valleys through which flow the creeks and rivers. These trees are young and vigorous, and have every appearance of having obtained recently a foothold. Further down these streams the trees are larger, and finally we come to groves of mature trees. The same facts may be observed with less emphasis with regard to the Red Oak (*Quercus rubra*), Black Walnut, Bitter-nut Hickory (*Hicoria minima*), Kentucky Coffee-tree (*Gymnocladus dioica*), Honey Locust (*Gleditsia triacanthos*), Green Ash (*Fraxinus lanceolata*). All of these species appear to be moving westward, the trees of the most westerly stations being nearly always young and vigorous.

With the western species it is nearly the same. While at some stations the Pine-trees upon outlying borders are apparently the remnants of a former larger growth, in

many other places these outliers are growing and vigorous. This was particularly noticeable in a recent visit to Cheyenne Ridge, where but one explanation could be given for the present distribution of individual trees upon the spurs and hillsides. It is very certain that upon Cheyenne Ridge the Pines are slowly pushing eastward, and that, in spite of the ravages of man and of herds of cattle, horses and sheep, this species is more than holding its own. Upon some parts of Pine Ridge man's interference has checked the advance of the Pine, and this is the case also in some places along the Niobrara River, but in many other places the young trees are springing up and vigorously contesting with Grasses and weeds for the possession of the ground. The Mountain Maple and the Cañon Birch give one the same impression of a successful and comparatively recent advance into a territory formerly unoccupied. Even the shrubby Mountain Mahogany upon the slopes of the Wild Cat Mountains is evidently fighting a winning, and not a losing, battle. No one can ride through the mountain cañons and see the vigorous plants of this pretty species and come to any other conclusion than that there is here a strong eastern advance of a western species.

With respect to some of the trees upon the Nebraska plains I have to admit that it is at present impossible to see either advance or retreat. It is probable that in some instances, as for example the Paper Birch (*Betula papyrifera*), the trees have remained where they are for ages, without perceptible change in area. Perhaps we have in this tree a survival from the glacial migration from the far north. Likewise, I find it impossible to pronounce upon the status of the Basswood, Cottonwood, Elm, Silver Maple, Buckeye, Cherries, etc. They have as yet not shown anything which is conclusive either way.

From such evidence as we have thus far, it is evident that some of the eastern trees are advancing toward the west, and that some of the western trees are advancing eastward. In other words, we can say that some of the species are not receding from the Nebraska plains, and that as to other species the evidence of advance or retreat is wanting.

Lincoln, Nebraska.

Charles E. Bessey.

Exhibitions.

Chrysanthemums in Philadelphia.

THE annual Chrysanthemum exhibition of the Pennsylvania Horticultural Society, held in Philadelphia last week, was generally considered one of the best in recent years, especially in the classes of cut chrysanthemums, orchids and decorative plants. The Chrysanthemum-plants shown by the Penn Rock Company and by Gordon Smirl were excellent, and won several prizes. Among other winners of awards for plants were John McCleary, J. E. Krayner, Henry B. Surman, G. Wilbur Brown, John McGowan, James O'Brien, Mathew Bracken, William Robertson and John Mitchell.

In the classes of cut chrysanthemums Percival Roberts, Jr., Esq. (John Cullen, gardener), won a special premium of a silver cup for a magnificent collection, not in competition. A delicate pink seedling shown by Henry B. Surman, gardener to E. W. Clark, Esq., was awarded first premium, and a new yellow sport from Mrs. Jerome Jones was awarded a certificate of merit; the latter was shown by George F. Baer, Esq., Reading (Ferdinand Heck, gardener). The new Pennsylvania, noted in the account of the exhibition in Boston last week, attracted much attention, and was awarded a silver medal and also a certificate of merit. The color is a clear yellow and the flowers appear to the best advantage under artificial light. Hugh Graham & Son were the exhibitors of this promising novelty. First prizes for cut flowers were also awarded to A. Herrington, Madison, New Jersey; Henry Weber & Son, Oakland, Maryland; E. M. Wood & Co., Natick, Massachusetts; John McCleary; John T. Harrison, Bethayres, Pennsylvania; Wm. K. Harris, Robert G. Carey, Edward Jones, Martin Montague, William Robertson, Henry G. Standen, Jos. Monahan, John Mitchell and George Middleton.

The Henry A. Dreer Co. showed an unusually fine collection of decorative plants, including a group of *Cibotium Scheidii* and one of *Latania aurea*, besides a notably interesting exhibit of aquatics. Hugh Graham & Son, Mrs. George B. Wilson and A. Woltemate showed large and

valuable collections of Orchids. Thomas Logan, gardener for Mr. William L. Elkins, Jr., exhibited a new *Dracaena*, *D. Elkinsii*, which was awarded a certificate of merit. A silver medal was won by Henry T. Clinkaberry, gardener for C. G. Roebeling, Esq., Trenton, New Jersey, for the new American seedling *Cypripedium*, Edwin Lonsdale. This is described as a hybrid variety from *Cypripedium Rothschildianum*, fertilized with *C. barbatum superbum*, being the first cross from *C. Rothschildianum* that has ever bloomed. The foliage is intermediate between that of *C. Rothschildianum* and *C. barbatum superbum*, being very fleshy. It is evidently a free grower, being in perfect health. The flower-stem is two inches in length. The slipper resembles that of *C. Rothschildianum* in form, with the color of that of *C. barbatum superbum*; sepals three inches long, profusely blotched with brown spots on light green ground, rosy purple points, hirsute appendages along edges; dorsal sepal somewhat broader than that of *C. Rothschildianum* and of similar markings, suffused with rose.

A large number of seedling Carnations were shown, many having real merit. The premium for the best American seedling was awarded to C. W. Ward, Queens, Long Island, for Mrs. James Dean, a light pink, the edges somewhat fringed. Peter Fisher, of Ellis, Massachusetts, was awarded a certificate of merit for a new Carnation, Mrs. Thomas Lawson; John Burton won the same honor with a new white Carnation, as did William Swayne, for a new crimson variety named Empress. Joseph Heacock won the Craig Cup with a new pink variety, Elizabeth. William P. Craig won a first prize for 100 cut flowers of Flora Hill. Vegetables and fruits of high quality were shown in profusion as in former years.

Horticultural Hall, the beautiful permanent home of the Pennsylvania Horticultural Society, lends itself admirably to floral decoration, and on this occasion the spacious foyer and exhibition halls and the broad staircases were delightful in their luxuriance and in the wealth of color.

Notes.

The flowering in England of our *Cornus florida* is an unusual occurrence, and the fact is interesting, recorded by a correspondent of *The Garden*, that two trees at Grayswood Hill, Hastemere, flower more or less every year and some years abundantly.

A portrait of the base of the trunk of a remarkable specimen of the so-called Red Cedar of the north-west coast (*Thuja plicata* or *gigantea*) is published in a recent issue of *The Pacific Rural Press*. This tree stands near Snoqualmie Falls, on the Seattle & International Railway, and the circumference of the trunk at the ground is given as one hundred feet and seven inches. As this is one of the slowest-growing of the western conifers, this tree has probably lived for more than a thousand years.

In the display of timbers representing 118 varieties made at the Nashville Exposition by the Nashville, Chattanooga & St. Louis Railroad, and occupying ten thousand square feet of floor space and a large outside area, are two remarkable specimens of Yellow Poplar (*Liriodendron Tulipifera*). One of these is a log forty-two feet long, ten feet four inches in diameter at the butt, and seven feet in diameter at the smaller end. This specimen contains 1,260 cubic feet and is about 600 years old. The other specimen is forty-eight feet long with an average diameter of seven feet.

The pale yellow-flowered Japanese *Prunus Maximowiczii*, which was first figured a few years ago in this journal (vol. vi., fig. 31), has been raised in the Arnold Arboretum from seeds brought by Professor Sargent from northern Japan, and, although it has not flowered yet in this country, it gives every hope of success here in its rapid healthy growth and perfect hardiness. At the end of October the plants were conspicuous from the scarlet coloring of the leaves, which are even more brilliant than those of *Prunus Pseudo-cerasus*, its associate in the forests of Yezo. Of the deciduous-leaved trees entirely new to cultivation this Cherry is certainly one of the most promising and interesting.

The opening of the new Agricultural Building of the Tuskegee Normal and Industrial Institute, at Tuskegee, Alabama, is announced for November 30th. Some 1,500 young negro men and women are receiving a liberal and practical education in this widely-known school, of which Mr. Booker T. Washington is the President. Professor G. W. Carver, Chief of the Agricultural Department of Tuskegee Institute, writes us that a few years ago the present horticultural grounds were

little more than shifting sands and gullied hillsides, with here and there small tufts of *Yucca*, *Cactus* and similar plants. The President from the start recognized the possibilities of this important feature of his school, and the first invoice of material consisted of a miscellaneous lot of trees, ornamental shrubs and other plants, which were disposed of not according to their fitness for the place, but according to the fitness of the place for them, and the vegetable garden, orchard and flower garden all blended more or less into each other. As time passed and the soil improved the division lines became more and more apparent, until there is now an orchard consisting, approximately, of 1,380 Peach-trees, 50 Plum-trees, 1,300 Grapevines, 20 Fig-trees, 20 Quince-trees and 120 Pear-trees. The San José scale made its appearance a few years ago, and is being vigorously fought. This pest, in connection with drought and other local troubles, has affected the results, but, aside from these drawbacks, the horticultural work has been successful. Pears have equaled those from California in size and in abundance. Plums have been grown with pronounced success, the Burbank and several types of the Japanese having done especially well. Figs and Grapes flourish here, and 18,000 Strawberry-plants are under cultivation. The gardens, lawns and campus have been transformed, flowering plants, native and introduced shrubs being freely used. Bermuda Grass is depended upon for the lawns. Hon. James Wilson, Secretary of Agriculture, will deliver the principal address on the occasion of the opening of the Agricultural Building, which has been erected at a cost of \$10,000, and other guests will include the donors of the building, the Governor of Alabama and the State Superintendent of Agriculture. The first floor contains the industrial class-rooms, with a seating capacity for seventy-five persons. The large museum-room contains sections devoted to botany, geology, histology, entomology and ornithology. In the chemical laboratory students will receive instruction in practical analysis in the animal, vegetable and mineral kingdoms. The upper floor is devoted to the dairy lecture-room, agricultural lecture-room, herbarium and reading-room, and the basement to dairying, cheese-making and similar uses.

An interesting collection of tropical fruits reached this city recently from the Botanic Gardens in Grenada, a British possession, the southernmost island in the Windward group. The consignment was shipped on October 23d. A delay of ten days in entering the fruits at this port, due to the unusual character of the invoice and the want of established rates of duty, proved fatal to many of the more perishable kinds, but enough survived to give distinct character to the select stock in one of the fancy-fruit stores on Broadway. These West Indian fruits included especially juicy oranges of excellent quality. The Tangerines and Mandarins were superior, and sold, as did the oranges, at \$1.00 a dozen. Among other citrus fruits were lemons; these were less attractive, being of uneven size, thick-skinned and rough. The limes were remarkably good, and sold for forty cents a dozen. An unusual offering in this city were citrons, the fruits of *Citrus Medica*, familiar to housekeepers in their candied peel; there were undersized green fruits and mature ripe specimens; the latter, cut with a piece of the stem, were lemon-shaped, large as grape-fruits, the rough skin unevenly colored in shades of lemon and orange. These sold for twenty cents each. In this unique collection sapodillas, the fruits of *Sapota achras*, were fortunate in showing to better advantage for the long time consumed in reaching customers, since these are at their best when more than fully ripened, and the grayish earth-colored globular fruits were in the juicy sugary stage. They sold for fifteen cents each. A single specimen of the brownish-yellow fruit of *Lucuma mammosa* was exhibited, and some of the large brown nuts. Alligator pears were among the fruits lost through the delay, and the few bananas which were yet edible were remarkably good in quality, the yellow fruit of medium size having rich, creamy white flesh, while the red bananas were of especially fine flavor. The latter, one of the most rare of all fruits in this market since the supply was cut off by the Cuban war, found eager purchasers at \$1.00 a dozen. Several bundles of stick cinnamon also sold readily. Among choice offerings now regularly in trade are Gros Colman grapes, from England, and from Newport, the former costing \$1.75 a pound, and the latter twenty-five cents less. Hothouse-grown cucumbers and tomatoes are as bright and attractive as the most showy of fruits. The so-called Spanish melons, from Italy; richly colored pomegranates, from California, as brilliant as the showiest of apples; Japanese persimmons, from Florida; and English cob nuts, in their husks, are other seasonable offerings in the best stores.

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The Soldiers' and Sailors' Monument.

EVERY one who is concerned to-day in the erection of a monument of any sort in this city wishes it placed in Central Park, where, as a rule, monuments do not belong and could not be properly placed to secure their best effect, and where they would injure the effect of the park itself. When a site within the Park cannot be secured, a position close to one of its chief approaches is desired. This is a more justifiable wish. But, again, its result cannot be good unless the character of the proposed monument and the manner of its placing both conduce to dignity and harmony of general effect. No greater mistake can be made in such a matter than the placing of a monument, however good, in such a way that it will embarrass the designer who may hereafter be called upon to treat the remainder of the space in which it stands, or to supply those monumental entrances which were contemplated by Messrs. Olmsted & Vaux when they designed the park itself.

Just now this matter is peculiarly important, when \$250,000 have been secured for the erection of a Soldiers' and Sailors' monument in this city. Neither the wishes of those army and navy men who desired to have the monument placed on Riverside Drive, where the tomb of their great leader stands, and where it would be visible from the water as well as from the land, nor the recommendations of the experts asked by the committee of city officials to advise in regard to its site, were regarded by this committee. Moved by the too general wish to connect their monument with Central Park, and to place it where it would be seen, not by the greatest number of persons, but by those who roll by in their carriages, a site close to the Fifth Avenue and Fifty-ninth Street entrance has been chosen. The designer of the monument has also been chosen. Competent judges declare that the schemes which he presented were good in themselves, and would be less offensive on the selected site than any offered by other competitors. Nevertheless, if this monument is set on the indicated spot it will seriously hamper the work of any artist who may hereafter be commissioned to treat the Plaza and the adjoining park entrance in a systematic and proper way.

Mayor Strong, who has done much for the beautifying of New York during his three years' administration, tried to do one thing more when he declared that nothing whatever ought to be placed on or near the Plaza until two million dollars had been appropriated for its right adornment as a whole. This even now would be a difficult task. Tall and ugly buildings occupy two sides of the Plaza, and the lines of the streets and park roads which run out from it cannot be brought into harmony with an absolutely symmetrical scheme. But a symmetrical scheme is not the only possible good one even in urban adornment; and if two sides of the Plaza are badly built upon, the Park to the north and the great Vanderbilt house to the south with the vista of Fifth Avenue beyond it, supply conspicuous elements of beauty. A really able designer can still give us a beautiful Plaza if no more incongruous elements are introduced before he gets to work, and if he is not too closely hampered by that love of exact symmetry which in many of our architects has recently developed into an unreasoning passion, not unnaturally in view of the discord and heterogeneousness which most parts of our city display. A perfectly balanced and majestically uniform effect can never be produced on this spot; but a dignified, harmonious and effective one may be achieved if every foot of it is now jealously preserved intact until such time as its embellishment as a whole may be undertaken. Until this time comes, however, the most careful artist cannot erect any monument within sight of the Plaza and keep its general effect in mind; for, of course, he cannot divine how this effect may eventually be conceived. The only safe way is to do nothing here, but for the time being to place all contemplated monuments in localities for which so comprehensive a plan is not required. There are many such situations not far from Central Park, and it ought still to be possible to secure the placing of the Soldiers' and Sailors' Monument in one of them, and to consider again the advice given by the experts who were consulted by the committee in the first instance. Or, if this is impossible, the site should at least be shifted a little farther north. The monument should not stand in the large circle at Sixtieth Street, which is an integral part of the Plaza, but at the extreme northern end of the Plaza between Fifth Avenue and the entrance to the driveway of the park. Here such a form as the selected architect has chosen would be quite as appropriate as on the proposed site; and it might be worked with less difficulty into that general scheme for the adornment of the Plaza and the park entrances which, at some future day, the city will certainly wish to take in hand.

VENERATION for very large or old or otherwise remarkable trees is an indication of civilization and cultivation which is not always as common in America as it should be. In every country of Europe exceptionally large and old trees are revered, and it would be considered a sacrilege to injure them. Their portraits are frequently published and their histories are familiar to all classes of the community. As the primeval forest disappears its remnants become sacred, and if we in this country are not more alive to the necessity of preserving our remarkable trees it is, perhaps, because we have not yet lost the instincts for forest destruction inherited from ancestors who, forced to cut trees in order to raise bread, had their hardest struggle with the forest. Too often we hear of noble trees being needlessly sacrificed even in the oldest and most civilized states, and it is, therefore, pleasant to know that a determined effort will be made by some of the inhabitants of Media, Pennsylvania, to preserve from destruction a remarkable group of four *Sassafras*-trees standing in the neighborhood of that town. The largest of these trees at three feet from the ground is twelve feet six inches in circumference and about eighty feet in height; the others are nearly of the same size and all are healthy and symmetrical. These are the largest *Sassafras*-trees east of the Mississippi River of which there is any record,

and even in southern Arkansas, where this tree grows to its greatest perfection, it would be difficult to find many individuals to equal them. The owner of the trees having declared his intention of cutting them down this winter, the attempt will be made to buy the land on which the trees stand or the right for them to grow indefinitely. It would be more than a local and state misfortune if this movement failed of success or if these trees, which are probably several hundred years old and are still in perfect health, should not be allowed to live to show the size and beauty of our Sassafras, the only species in all the world, can attain under favorable conditions.

Notes on Cultivated Conifers.—VIII.

IN *Pinus* the world finds some of its most valuable timber-trees and a few park and garden trees of great beauty and interest. The genus is well distinguished by its clustered secondary leaves which are enclosed in the bud by numerous scales which lengthen with the growing leaves and surround their base with a thin, more or less persistent, sheath. *Pinus* is further distinguished by its involucre, fascicled, staminate flowers and by its woody cones, which mature at the end of their second, or rarely at the end of their third season. *Pinus* is widely spread over the northern hemisphere, forming on maritime plains, mountain slopes and dry interior plateaus vast continuous forests, or is scattered singly and in groups through deciduous-leaved trees. About seventy species are now recognized by botanists who still have much to learn of the Pine-trees of Mexico, Central America and the interior of China. In the United States thirty-four species, or about half of those now known to science, find their homes; the genus is largely represented in Mexico, northern India, and in all the region bordering on the Mediterranean, which in number of species is the stronghold of the genus in the Old World. Various methods for grouping the species in sections have been proposed. That based on the number of leaves in each cluster, which, less scientific than the one now generally in use, is perhaps the most satisfactory for cultivators who often have to deal with plants which are not large enough to produce flowers or cones. Adopting this method of arrangement the species of *Pinus* fall, with some exceptions, into three sections—the first with five leaves in a cluster, the second with three leaves in a cluster, and the third with two leaves in a cluster. On the trees of the first section the leaves are usually long, slender and blue-green with deciduous sheaths; the cone-scales are usually thin and mostly unarmed, and the wood is soft, light-colored and homogeneous; on those of the other sections the leaves are, as a rule, much stouter and usually dark yellow-green; their leaf-sheaths are mostly persistent during one or many seasons, their cone-scales are thickened and generally furnished with spines, hooks or prickles, and their wood is hard, heavy and marked with broad bands of resinous cells.

For our region the most valuable ornamental trees are found in the first section. These are all inhabitants of northern or of elevated countries and most of them flourish in the north-eastern states. The type of this section, *Pinus Strobus*, our native White Pine, is the most valuable tree of the whole genus for the parks and gardens of the wide region which it inhabits naturally. Wherever a collection of trees was planted in the north-eastern states more than fifty years ago the White Pine is found to surpass all other conifers, when any others have survived, in height, thickness of trunk and health. Impervious to the cold of the Canadian winter and the burning suns and dry winds of the prairies of Kansas, the White Pine flourishes also as no other exotic conifer flourishes in central Europe; and in the gardens of northern Italy it is as vigorous and beautiful as it is in the forests of Michigan and Minnesota. The brittleness of the branches of this tree, which frequently break under a load of snow or frozen sleet, is the one drawback to the White Pine as an ornamental tree, the symmetry of

isolated specimens being frequently ruined from this cause. The White Pine grows well on dry sandy drift gravels, but only attains its noblest dimensions on well-drained rich soils, when its roots can reach abundant and constant moisture. In cultivation here at the north it will usually outgrow from the start almost every other conifer, but newly planted seedlings do best when they are protected from wind and sun, for the White Pine is a shade-enduring species, and in the forest the seeds germinate most freely and the seedlings grow for many years most vigorously under the shade of other plants. No other tree breaks up so well the flatness of the forest roof, and no other tree that can be used here is so valuable to enliven the monotony of a sky-line with its dark green wide-spreading crowns raised high on stately stems. Only a few abnormal forms of the White Pine are cultivated. *Pinus Strobus nivea*, which is probably of nursery origin, is distinguished from the ordinary form by its rather lighter-colored bark, shorter paler leaves and denser foliage. More distinct than this is *Pinus Strobus nana*, a low compact, round-topped bush, seldom growing more than five or six feet tall, with abbreviated crowded branches and short leaves; this is, perhaps, one of the most distinct and beautiful of all the dwarf conifers in cultivation. A dwarf form with pendulous, nearly prostrate, branches is grown in the Arnold Arboretum, where Mr. Dawson has also propagated plants from a remarkable tree growing in the town of Dracut, Massachusetts, with short, slender, nearly erect branches usually in whorls of three, forming a dense low round-topped head.

In the section *Strobus*, to which our White Pine belongs, are two west American Pines, *Pinus Lambertiana* and *Pinus monticola*. The former, the Sugar Pine of California, is the largest of all Pine-trees, individuals over 200 feet in height with trunks ten feet in diameter being not uncommon. Although this tree was introduced into English gardens as long ago as 1831 by its discoverer, David Douglas, it has never proved very successful as a cultivated tree. Removed from its native forests, where its growth is rapid and vigorous, it increases slowly both in Europe and the eastern United States, where it is perfectly hardy as far north, at least, as Massachusetts. Differing from *Pinus Strobus* while young only in its stouter and darker leaves, it has in our climate no advantage as an ornamental tree over our own White Pine, which grows much more rapidly, and the Sugar Pine will probably never be much cultivated here except as a curiosity.

The second western American Pine of this section, *Pinus monticola*, is also a great tree, only surpassed in magnitude by the Sugar Pine. This is a widely-scattered species, being distributed from the western slopes of the northern Rocky Mountains, over a large part of the elevated regions of the west, growing from the level of the sea on the shores of the Strait of Juan de Fuca to about 10,000 feet on the California Sierras, where trees with enormous stems and short contorted branches withstand for centuries the fiercest mountain gales. *Pinus monticola* has proved perfectly hardy in the neighborhood of Boston, where it has already produced cones. The cultivated trees can be distinguished from *Pinus Strobus* by their narrow pyramidal habit, short remote branches and rather thin foliage, and in beauty do not compare with the native species. Like the Sugar Pine, *Pinus monticola* will probably never be largely used by eastern planters.

In Asia the section *Strobus* has a representative in *Pinus Nepalensis* (the more usually accepted name of this tree, *Pinus excelsa*, is unavailable, as it has been used before for another species), an inhabitant of Himalayan forests, where it is scattered from Afghanistan to Bootan between elevations of 5,000 and 12,000 feet above the sea-level. This is a beautiful tree with long, slender, tufted, drooping foliage, attaining sometimes in its native forests a height of 150 feet. For many years this Himalayan Pine has been used in temperate Europe and in the eastern United States for the adornment of parks and gardens. Growing while young with great rapidity in cultivation, it often suffers in

the eastern states from the splitting of the bark, and in New England, where it is otherwise hardy, it is usually short-lived. Further south *Pinus Nepalensis* is more successful, and there are now large healthy cone-bearing trees in the Central Park, New York, and in the neighborhood of many of the cities of the middle states.

In Europe *Strobus* appears in *Pinus Peuce* of the mountains of Macedonia, Servia and Montenegro, a tree which has been sometimes considered a geographical form of the Himalayan White Pine, from which it differs, however, in its much shorter and more persistent leaves. In the Arnold Arboretum, where *Pinus Peuce* is quite hardy, it differs from the Indian tree in its closer and more pyramidal habit and denser foliage. This is a slow-growing tree here, with no special ornamental value, and is chiefly interesting as the European representative of a group principally indigenous in the New World.

The Pines which we have mentioned all belong to a subsection of *Strobus* in which the wings of the seeds are longer than the seeds themselves, but there are other five-leaved Pines, with pale, soft, straight-grained wood, which have seeds with narrow wings much shorter than the seeds. To this group belong the Rocky Mountain White Pine (*Pinus flexilis*). See f. 19 in the current volume of GARDEN AND FOREST, a beautiful tree widely distributed over the mountain ranges of the interior of the continent. It is hardy in the neighborhood of Boston, but in the east grows very slowly, suffering severely here from fungal diseases, and plants thirty-five years old are not more than four or five feet high, with tufts of miserable stunted foliage on the ends of naked branches. In England *Pinus flexilis* appears to do better than it does on the Atlantic seaboard, and in the Royal Gardens at Kew there is a tree twenty-five feet in height and probably of the same age as the Boston specimens, which were raised in the Harvard Botanic Garden from seeds collected by Dr. Parry in 1862 in Colorado. A year ago the Kew tree produced cones.

Another Pine of this sort, *Pinus albicaulis*, also inhabits the mountains of western America; it is an alpine tree, distinguished by its thin creamy white bark and short, nearly oval, cones with much thickened scales. This tree is said to have been introduced into Scotland in 1851 by John Jeffrey, who discovered it in that year on the mountains which rise above the valley of the lower Fraser River. I have never seen it, however, in Europe, and it has not been tried in this part of the country. Like other trees which grow naturally only at high altitudes, it will probably grow very slowly at the sea-level, even if it could be induced to grow here at all.

Pinus Cembra, the Swiss Stone Pine, is another of the White Pines with narrow seed-wings. It is a native of the mountains of central Europe, of northern Russia, and of Siberia where it sometimes forms pure forests of considerable extent. *Pinus Cembra* is always a slow-growing tree, with short, slender horizontal branches which in youth form a dense compact pyramid, and stout rigid blue-green leaves clustered at the ends of the stout branchlets. This tree is an old inhabitant of gardens and is perfectly hardy in New England, where, however, it grows very slowly, retaining its dense, handsome pyramidal form until it is twenty-five or thirty years old, and then frequently becoming thin and ragged. A species, *Pinus pumila*, nearly related to the Stone Pine covers the high summits of the mountains of northern Japan with broad, almost impenetrable, thickets four or five feet high, and is widely scattered also over Saghalin, Kamtschatka and the Kurile Islands. This shrub has probably never been tried in our gardens, where it may be expected to be hardy and to grow very slowly.

In Japan the five-leaved Pines are also represented by *Pinus parviflora* and *Pinus pentaphylla*. The former is one of the most attractive of the exotic Pines which decorate our gardens. It is a common inhabitant of mountain forests above elevations of five thousand feet, through which it is found scattered either singly or in small groves, occa-

sionally growing to a height of sixty or seventy feet. This tree is a great favorite with the Japanese, and one of the principal subjects which they employ in dwarfing. In our gardens, where there are now specimens from twenty to twenty-five feet in height, *Pinus parviflora* grows rapidly, sending out long picturesque, persistent branches clothed with tufts of blue-green leaves and loaded with short oval cones which, after ripening, turn nearly black and do not fall for months. This beautiful tree, which is still rarely seen in this country, is admirably suited for the adornment of small gardens. The other Japanese five-leaved Pine (*Pinus pentaphylla*), recently distinguished by Mayr, is a rare inhabitant of the mountain forests of southern Yezo. This little-known tree, long confounded with *Pinus parviflora*, has been raised in the Arnold Arboretum, where it seems to be hardy enough, although it is still too early to say much about it.

Pinus Koraiensis is a small five-leaved Pine, which is another really valuable plant in the gardens of the north-eastern states. A native of Corea, northern China, Manchuria and Kamtschatka, it was long ago introduced into Japan, probably by Buddhist priests, and is now one of the plants commonly seen in temple gardens. From Japan it was brought to the United States about thirty years ago and has proved entirely satisfactory here. In the color of the leaves it resembles *Pinus Strobus*, but it is more compact in habit and the foliage is much more dense, as the leaves do not fall until their fourth or fifth year, and therefore clothe the branches for a long distance back from the tips, while in *Pinus Strobus* the leaves mostly fall during their second year, leaving the branches bare, except at the extremities. *Pinus Koraiensis* now grows freely in the neighborhood of Boston, producing seeds, which, like those of all the five-leaved Pines with narrow seed-wings, are large and edible.

C. S. S.

Notes from South-western China.

The following notes are from a personal letter from Dr. Augustine Henry, dated at Mengtse, September 9th of this year :

I may mention that I have found a magnificent *Paulownia* with evergreen leaves, which is the most gorgeous sight when in flower imaginable. *Lonicera Hildebrandiana*, discovered by General Collett in the Shan States, also occurs here in the mountains. It is a rambling shrub, climbing over rocks. The flowers are deep yellow and about seven inches in length. *Leucosceptrum canum*, of northern India, is a remarkable Labiate, common in mountain woods at about 5,000 feet altitude. It is a tree some twenty feet high, and in habit is exactly like a *Buddleia*.

Yunan is a large province, and is associated in the minds of botanists with the wonderful discoveries of Pere Delavay. He collected mainly in the west of the province on the high mountains near Tali, which are practically spurs of the Himalayas. The region here, that is, Mengtse and to the south, crossing the Red River, and extending as far as the Shan States under French control, is very different from Delavay's ground, and will probably turn out as rich in species, new and interesting, but not so suitable for introduction into cultivation, as the mountains do not rise to the heights seen in the vicinity of Tali. Here, nevertheless, are many fine *Rhododendrons*, and there is a great variety of *Cyrtandreae*. These are always beautiful plants, occurring as a rule in shaded parts of mountain forests, mainly on rocks. A good many *Begonias* also occur in the same habitat.

The forests are more beautiful as one approaches and enters French territory, simply because the Chinese have not been there long enough to destroy them. They are migrating southward all the time and opening up forest land to cultivation. Curiously enough, it is two American plants which enable them to extend cultivation high up on the mountains, namely, Maize and the common Potato (*Solanum*); and the opium Poppy, too, can be cultivated with profit to a high altitude. In ancient times the aborigines, who were the only inhabitants of the mountains, depended almost entirely on the Tartar Buckwheat (*Fagopyrum Tartaricum*), which succeeds much better at high elevations than the common Buckwheat (*F. esculentum*). South of the Red River there was scarcely

a single Chinese sixty years ago, but now there are many settlements and the forests are disappearing.

There does not seem to be one Frenchman in the northern part of Indo-China interested in botany, and this is a great pity, as the mountainous part of their territory is finely forested and rich in plants, and French officers, civil and military, are scattered everywhere in isolated posts. The botanical source of some of their interesting products is quite uncertain. For example, the Cassia-bark which is cultivated in the Chinese province of Kwangsi and reaches foreign countries by way of Pakhoi and Canton, is undoubtedly the product of *Cinnamomum Cassia*, but from Annam there is a very large export of so-called cinnamon, which is a different thing, and the tree yielding it is unknown. Another curious export happens to be known, as specimens were found in China. This is what the French call "faux gambier." It is the root of a wild Yam (*Dioscorea rhipogonoides*), and is much used by the Chinese in dyeing.

I forgot to mention in regard to cinnamon that the Chinese give fabulous prices for certain varieties which occur in the mountains of Tongking—as much as \$50.00 for two pieces of bark fifteen inches long and four inches wide, to give a concrete example. Such bark is supposed to cure all diseases. It would be very interesting if some French official on the spot would collect botanical specimens of the trees, the bark of which has such a commercial value.

Travelers and residents in foreign countries are always possessed with the idea that anything with a common general name is thoroughly known to science; and we are still in the dark in consequence in regard to the sources of certain kinds of rhubarb, cinnamon, indigo, textile fibres, etc.

As an example of the interest in cultivated and useful plants I may cite the Sweet Potato. This is cultivated largely in China, and is unquestionably an introduction from America. But the plant cultivated in central China and in Yunnan is *Ipomoea fastigiata*, and not the common form of *I. Batatas*. Mr. Hemsley is of opinion that the latter is only a cultivated variety of the former species, which is known in the wild state.

New or Little-known Plants.

Prunus Pseudo-cerasus.

THIS is a native of eastern Asia, where it is widely spread from Japan to central China, Saghalin and Manchuria, and is a noble tree in the forests of Yezo. There is still much confusion with regard to the Asiatic Cherries of this group, and whether the wild single-flowered tree which is figured on page 463 of this issue from specimens gathered in the forests near Sapporo is really the plant described by Lindley as *Prunus Pseudo-cerasus* or not we are unable to determine, as some of the numerous double and single flowered varieties cultivated by the Japanese are possibly derived from still little-known allied Chinese species. Under whatever name, however, it should be known by, this Cherry of northern Japan promises, as has lately been stated in these columns, to become a valuable ornamental tree in the north Atlantic states.

It is a glabrous tree, growing in the forests of Japan seventy or eighty feet in height, with a trunk frequently three feet in diameter, covered while young, like the branches, with lustrous light red-brown bark, oblong elliptical or obovate coarsely serrate leaves abruptly contracted at the apex into long points, corymbose white flowers from a quarter to a half of an inch in diameter, opening with the unfolding leaves, and small pea-shaped fruits with thin flesh.

Very conspicuous in early spring when covered with its abundant flowers, *Prunus Pseudo-cerasus* is also conspicuous and very beautiful in the autumn when the leaves turn dark red. The wood of this tree is highly esteemed in Japan, where it is largely used principally for carving and for blocks used in printing cloth and wall paper.

In the Arnold Arboretum young trees of this Cherry are in perfect health and are growing rapidly, and, although they have not flowered yet, they show in autumn the splendid leaf color which is one of the great attractions of the Japanese forest at this season of the year, just before the Maples, which change color a little later, light them up with more brilliant shades of scarlet.

Foreign Correspondence.

London Letter.

NERINES.—The genus *Nerine* has been a favorite greenhouse plant for flowering in late autumn from the earliest times, and one species, *N. sarniensis*, which is grown in large quantities by the Dutch and other bulb growers, is distributed when dry in the same manner as Hyacinths, Tulips, etc. There are fifteen species, according to Mr. Baker, and some of these have been crossed with each other by Dean Herbert, Max Leichtlin, Moore, O'Brien, Mansell and others, so that we now have a large number of seedlings and crosses of more or less horticultural value. Mr. Elwes has recently been at work upon the genus with a view of obtaining late-flowering varieties, for instance, such as might be had in December. There is no reason why, in the course of time, this should not be accomplished. Meanwhile, he has got together a large collection of sorts in his garden at Colesbourne, and the group he exhibited at the last meeting of the Royal Horticultural Society showed that he is a master in the art of growing and flowering these plants. In addition to the older standard sorts he exhibited a number of new seedlings, eight of which received certificates. They are all named in compliment to some lady, such as Lady Lawrence, Lady Bromley, etc. Mr. Elwes has evidently worked principally with the various forms of *N. sarniensis*, which include those known in gardens as *Plantii*, *venusta*, *corusca* and *rosea*. These, with *N. curvifolia* and its variety, *Fothergillii*, are the best of the genus in point of color, vigor, etc. This habit of growing in winter and resting in summer makes the cultivation of *Nerines* somewhat difficult in localities where sunlight, so essential to good growth, is obscured by fogs and general murkiness, as, for instance, at Kew; but where these are not experienced they may be grown as easily as Daffodils. They require liberal treatment while growing, say from October to April, to be followed by absolute rest induced by drought and exposure to air and bright sunshine until the flower-spikes show in September.

PROTEA CYNAROIDES, var. ELLIPTICA.—This is a dwarf shrub compared with the type, of which an illustration, prepared from a plant grown at Kew, was given in GARDEN AND FOREST (vol. viii., p. 34). A plant of the former is now flowering freely in the Cape house at this establishment; it is a yard high, freely branched, and each branch is terminated by a flower or bud, or rather flower-head, measuring eight inches in diameter and composed of a cup-like whorl of stiff, pointed, lanceolate, petaloid bracts colored flesh-pink, the whole of the centre being occupied by a cushion-like mass of stamens, which are united, except round the margin. For a cool house, such as suits Cape Heaths, this is a commendable shrub, as it flowers freely when small, while the flowers are not only exceptionally attractive in size, form and color, but they have the merit of lasting six or eight weeks or even longer. The Kew plant was raised from seeds sown in 1890, and it first flowered two years ago. I can recommend the genus *Protea* as worthy the attention of horticulturists in such states as California.

LONICERA HILDEBRANDIANA.—It is nearly four years since this plant was introduced to Kew from Burma, but we have not succeeded in flowering it yet, although it grows most vigorously in the varying conditions under which it is being tested. It was discovered in Upper Burma by General Sir Henry Collett nine years ago, who described it as "a conspicuous shrub with large, dark glossy leaves and fine crimson flowers seven inches long." At Kew it is a stout climber with stems twenty feet long and ovate leaves six inches by four inches. It is not hardy, but grows freely in the Winter Garden. Meanwhile, Mr. Hildebrand wrote from Burma in April last, "I am sorry that you are unable to flower the large Honeysuckle. It is a sight to behold just now in my garden and surprises the densest observer in horticultural matters. It is a mass of

flowers, white when they first open and of a lovely gold when far spent. It flowers on last year's wood." There is evidently some mistake with regard to the color of the

Kew, where it first fruited three years ago. It has long, quick-growing, angular climbing stems, which attain a length of twenty or thirty feet before flowering, and they



Fig. 58.—*Prunus Pseudo-cerasus*.—See page 462.

flowers. I hope to hear of its flowering shortly in California.

MOMORDICA MIXTA.—There are three fine fruits of this splendid tropical gourd on a plant in one of the stoves at

bear numerous large palmately lobed, smooth, shining dark green leaves and one-flowered axillary peduncles. The male and female flowers are borne on separate plants, the male flowers being about three inches

across with velvety cream-white petals blotched with purple at the base. The male plant is worth a place in a warm conservatory as a handsome-flowered climber. The female flowers, which are smaller, when artificially fertilized develop large egg-shaped or oblong fruits nine inches long, the surface clothed with closely set spine-like points an eighth of an inch long; when ripe these fruits are of a rich scarlet color, on which account I should class them among the most ornamental of the Gourd family. The species is a native of India, China, etc. Good seeds were matured in quantity by this plant at Kew last year.

THE MANGOSTEEN (*Garcinia Mangostana*).—Fruits of the Mangosteen have lately been received at Kew from the Botanic Gardens, Trinidad, where trees have been established and have borne fruit since 1875. The tree is a native of the Malay Archipelago, and is cultivated in various parts of India. It forms a small conical tree twenty or thirty feet high, with bright green, Laurel-like, leathery leaves and fruits the size of an orange, with a hard smooth rind, colored dull purple, enclosing a spongy mass of pulp, which is divided into eight sections, as in the orange, two or three only of the sections containing each a single seed about the size of a plum-stone. The pulp is the delectable part, being white or pink, very juicy and of an agreeable flavor, suggesting that of the Granadilla. In the east the Mangosteen is considered to be the choicest of all tropical fruits; I question, however, if it would win such a position in temperate climes when pitted against the apple, pear, grape and pineapple. Still it has the charm of novelty, and would probably find a market here. The fruit appears to keep and carry as well as an orange.

THE DURIAN (*Durio-zibethinus*).—This is another Malayan fruit-tree which is celebrated for its large delicious fruits; delicious, that is, to those who have overcome its powerful disagreeable odor. Fruits of it have lately been produced by a tree in the island of Dominica, in the West Indies, and one of them was sent to Kew, where I ventured to taste it, half-rancid and evil-smelling though it was. I never want to taste it again. It is a large evergreen tree with the habit of a Pear (according to an example in the Palm-house at Kew, which is fifteen feet high), and oblong, long-pointed, gray-green leaves clothed with scales beneath. The fruit is like an enormous sweet chestnut, as large as a child's head, covered with hard spines and enclosing a mass of cheese-like pulp, in which the four or five large seeds are embedded, the pulp being the edible portion. The tree is said to be commonly cultivated throughout the Malayan peninsula and islands, where its fruit, during the period it is in season, forms the greater part of the food of the natives. The flavor of the Durian is unique, no other fruit combining such a delicious flavor with such an abominably offensive odor, which has been compared to that of rotten onions. When once the repugnance to this odor has been overcome the fruit becomes a favorite, Europeans becoming extremely fond of it. Mr. Wallace, in his *Malay Archipelago*, says: A rich custard highly flavored with almonds gives the best general idea of it, but there are occasional wafts of flavor that call to mind cream cheese, onion sauce, sherry wine and other incongruous dishes. . . . The more you eat of it the less you feel inclined to stop. In fact, to eat durians is a new sensation worth a voyage to the east to experience! From the condition of the fruit sent from the West Indies to Kew I should say the durian is a bad traveler. Still it ought not to be hard to overcome this difficulty, at any rate for the journey from the West Indies to the United States, where a fruit with such a character as Mr. Wallace describes ought to find a ready market.

NEW HYBRID ORCHIDS.—Messrs. J. Veitch & Sons exhibited two new hybrids last week which were awarded certificates. They were *Cattleya Olivia*, a hybrid between *C. Trianae* and *C. intermedia*, showing the influence of both parents in the habit and form of its flowers, which were of a rich peach-blossom color suffused with yellow; *C. Melpomene*, a hybrid between *C. Mendelii* and *C. Forbesii*,

with rose-colored flowers, the lip shaded with yellow and brown, with a heavy marginal fringe. A hybrid between *Cypripedium Haynaldianum* and *C. Chamberlainianum* was shown by Mr. E. Ashworth, and obtained a certificate. It is the first hybrid raised from the last-named species, but there was a doubt expressed with regard to the other parent. The hybrid has a white dorsal sepal lined and spotted with rose and brown, the petals are spirally twisted and colored green and brown, while the lip is rose-colored, tinged with green and yellow. A pretty variety of *Laelia Lucasiana* was shown under the name of *L. longipes*, and obtained a botanical certificate.

London.

W. Watson.

Cultural Department.

Japanese Plums.

IT is hardly ten years since Japanese plums began to attract the attention of fruit growers in the United States to any considerable extent, but it is now certain that they have won a permanent place among the cultivated fruits of this country. The best of them rank only good to very good in flavor and quality when compared with such varieties as Bavay's Green Gage, Washington, Jefferson and other choice kinds of the European species, *Prunus domestica*. The Japanese Plums are not exempt from black-knot, and, wherever I have had opportunity to observe them, are fully as susceptible to injury from leaf-spot (*Cylindrosporium padi*) as are the ordinary kinds of Plums. Our Plum orchards suffered from an unusually severe attack of aphid the past season, and native Plums of the Chickasaw, Americana and intermediate groups, together with the Japanese sorts, were injured worse than the varieties of *Prunus domestica*. Japanese Plums are apt to have the fault of the Wild Goose and many other native kinds in that the ripening fruit drops from the pedicel quite readily. Some of them, like Kelsey, are so tender that they cannot be fruited in the north. Ogon is the hardest in fruit-bud of the kinds fruited here, but it is not as hardy as the Italian Prune and others of the hardest *Domestica* kinds.

The colors of Japanese plums range from the clear yellow of the Ogon to the beautiful clear red of Red June and the darker, duller red-purple of Satsuma. Sometimes Burbank has a brilliant red cheek deepened to almost red-purple with yellow background, but neither the blue nor purple shades of the prunes and damsons characterize any Japanese plums. In some varieties the yellow is shaded with green, resembling somewhat the color of a Green Gage plum, and nearly all varieties have a delicate bloom, which, when it softens such brilliant hues as those of Red June and Wickson, adds much to the beauty of the fruit.

As compared with *Domestica* plums, none of the Japanese kinds rank best in quality, yet some of them have a sprightly, agreeable flavor and attractive colors, and are good enough in quality to sell well. Some kinds, like Abundance and Burbank, begin bearing very young, and are so exceedingly productive that it is advisable to practice thinning, not only to increase the size of the remaining fruit, but also to prevent injury from overbearing. Willard and Ogon ripen before the earliest of the *Domestica* kinds, and October Purple, one of Mr. Burbank's latest productions, as its name indicates, carries the season for Japanese plums late into the fall.

It is not at all probable that Japanese plums will supplant the older cultivated kinds where the latter can be grown to perfection as readily as can be done in central and western New York and in various other sections of the country, but they will doubtless supplement them to some extent. In some portions of the Hudson Valley, where the ravages of black-knot practically prohibit commercial orchards of *Domestica* Plums, the Japanese varieties are being grown successfully, and while not altogether exempt from black-knot, so far as my observation goes, they are practically free from that disease even where *Domestica* varieties near by are severely attacked.

As they are succeeding in some locations where black-knot is prevalent, and because of their wide range in season of ripening, their vigor and productiveness, their attractive colors and good shipping qualities, Japanese plums, as already remarked, have won a permanent place among our cultivated fruits. On this account it is especially unfortunate that in the process of introducing them into cultivation here much confusion in their nomenclature has arisen. Thanks to the efforts of some of our pomologists, and especially of Professor Bailey, whose Plum bulletins should be in the hands of every grower of this fruit, some progress has been made toward

establishing a correct nomenclature. The fact that seedlings of Japanese plums are apt to resemble the parent fruit very closely has made it all the more difficult to detect synonyms, and it is impossible always to identify a variety with certainty from illustrated descriptions.

In the interest of a uniform nomenclature it is desirable to call attention to the very interesting report of Mr. Orpet on Japanese plums in the current volume of GARDEN AND FOREST (page 347), and point out some of the instances in which the varieties as grown by him are evidently not true to name.

First, it may be said that the Japanese Plums are classed as *Prunus triflora*, not *P. Simonii*. Mr. Orpet voices the general opinion when he calls the Burbank the best of the Japanese plums, but its fruit is not "as large as a moderate-sized peach." Wickson is the only hardy Japanese plum yet introduced which answers that description. Kelsey is so tender that Professor Bailey, in his bulletin 131, says of it: "We still hear of Kelsey being fruited in New York, but in every case which we have investigated some other Japanese variety has been misnamed the Kelsey. The farthest north which I have known the true Kelsey to fruit is southern Delaware."

Mr. Orpet describes the Kelsey as greenish yellow and smaller in fruit than Burbank, but the true Burbank varies from an inch and a quarter to an inch and five-eighths in diameter, while the true Kelsey varies from two to three inches in diameter, and in color is of a bright red purple over yellow background. He speaks of Satsuma and Wickson as having a spreading habit of growth. Satsuma is somewhat open in its habit, but Wickson is decidedly upright, resembling *Prunus Simonii* in this respect, as also in its rather narrow conduplicate leaves. Possibly Mr. Orpet has the names Wickson and Burbank interchanged, for Wickson bears very large, attractive fruit of good quality, while Burbank has smaller fruit and is decidedly spreading in its habit.

Abundance is not quite equal to Burbank in quality, neither is it more attractive in appearance or more productive, but because it is a little earlier some have found it more profitable, especially during the past season, when by the time Burbank was ripe the markets were so loaded with other plums that prices ruled lower than they did when Abundance was ripening.

Agrl. Ex. Station, Geneva, N. Y.

S. A. Beach.

Recent Importations among Chrysanthemums.

FORTY-SEVEN varieties are but a small proportion of the whole number of new kinds of Chrysanthemums annually imported into this country, but among this number grown at the Cornell Experiment Station this year and last, are many that will be welcomed in America as distinct advances. The twelve Californian varieties (which are here included as foreign sorts), the four Australian and thirty-one European varieties (mostly English, from H. Cannell & Sons, Swanley, Kent) were tried in the same bed with eighty-eight American novelties of 1896 and 1897, and thirty-one seedlings sent to the station in advance of their introduction to the trade. These, with some thirty-four old and successful types, made a total of two hundred varieties with which the foreign sorts were obliged to compete on equal terms. The most remarkable feature of the collection was the scarcity of white varieties and their general failure. White is the most important single "color" in the trade, and there are said to be more new white sorts introduced every year than any other color.

Of one hundred and sixty-six novelties here reviewed nearly thirty per cent were pure white. Mrs. F. Hepper was distinctly inferior to our American favorite, Mrs. Henry Robinson, Alps to Mrs. J. Peabody, Taiwan to Mrs. R. Craig, White Swan to L'Enfant des deux Mondes, and Pride of Swanley, though not fully mature yet, can surely not rival Yanoma. Lady Esther Smith, which was recorded in Cornell Experiment Station Bulletin 136 as a new type of the greatest promise, has been a total failure this year in spite of the unprecedented success of the trial as a whole. Among the yellow varieties a welcome addition is a large, rather flattish, flower, named W. S. Devis, with rays an inch or more wide, as in Lady Esther Smith. It has only seven or eight series of rays, and a large disc, which, however, would not be objectionable even if it were not well hidden. It is as bold a yellow as Constance Terrell. Governor Budd is a yellow Chrysanthemum of the size and form of Philadelphia, and fades as badly, but begins with an orange of the shade of Pitcher & Manda. Triumph de St. Laurent is almost, if not quite, equal to H. L. Sunderbruch, one of the standard, midseason, commercial sorts. A. H. Wood is a quilled sort with a prominent disc, useless for the trade, but by reason of its marked individuality a worthy subject for

skilled amateurs, and one of the finer creations which private gardeners are on the lookout for. It will not stand shipment. Duchess of York is one of the best additions of recent years to the amateur list. We have not learned its special requirements yet. This variety and Defender were the only two sorts which suffered a loss of foliage at the base. The foreign bronze and buff varieties were numerous, but contained only three notable kinds. Mongolian Prince is the perfection of the Chinese type, and its roundness should make it excellent for shipping. It is a dull but rather rich color and too formal and regular to be a great favorite in America. Helen Owen is a fine whorled sort, but not suitable for the cut-flower trade. Buff Globe is a sport from the well-known pink Good Gracious, but is fuller and has a stronger neck. Khama is a good Japanese red, with characteristic and beautiful foliage. The color fades no more than any other red of the shade of Pluto or Loantika.

The Amaranth varieties, apparently, are more esteemed abroad than with us. Among the large reflexed sorts, Wood's Pet is by far the best of this color that we have seen in four years' testing of novelties. The form is precisely that of Vivian-Morel. Of the Japanese Incurved type it would be hard to choose between Australia, General Roberts and Pride of Madford. In all three the silvery reverse is the chief feature, the amaranth interior being suggested rather than disclosed. The first hides its disc, and the last two show it at an early stage, giving a striking effect upon which opinions are sharply divided. (There are two varieties circulating in England under the name of Pride of Madford, one of which is worthless.)

Among the pink varieties I see no advances. Most of the hairy sorts are of the familiar Japanese Incurved type, of which Mrs. Alpheus Hardy and Louis Boehmer are familiar examples. A new departure among the hairy sorts is the pink variety, Mrs. P. Rothenbush, which is reflexed, and soon shows its yellow disc. It can hardly be recommended. I see no improvement in the dark colors. For the exhibitor and private grower of skill Oriental Glory and Bellem are two sorts worthy of trial. The flowers are very large, last a long time on the plant and have marked individuality of form and color. Bellem has never been pink with us, as in England. It is the best primrose-yellow we know despite the great height of the plant and the awkwardly curled foliage.

The curiosity list has received two interesting additions in Mrs. J. Carter, a ball of shredded, tangled white, and Mrs. Filkins, which is smaller than Mrs. W. H. Rand, but just as much cut up and equally charming. Centaurea and Souvenir de Madame G. Eynard are two others which Cannell has introduced as "boutonniere, æsthetic and spidery" Chrysanthemums. The two last-named are not equal to our variety Shavings for attractiveness. The best of this list is Alice Carter, which, though curious, is agreed by all to be beautiful, and seems to be entirely new in form and color. The foliage is proportionately small and delicately cut. These novelties, while obviously different from other Chrysanthemums, should, according to the practice of the National Chrysanthemum Society of England, be classified as Japanese. This word, which was once used to designate geographical origin, has now come to be synonymous with miscellaneous or unclassified.

Ithaca, N. Y.

Wilhelm Miller.

Correspondence.

Uncultivated Crops in the Ozark Mountains.

To the Editor of GARDEN AND FOREST:

Sir,—Among the most interesting wild crops produced in the stony Ozark country, owing to its economic value, is Japan Clover, *Lespedeza striata*. The time and manner of the introduction of this pretty annual trifoliate into the United States do not seem to be definitely known. The Department of Agriculture mentions it as having been first noticed near Charleston, South Carolina, about 1849, and says that the seeds probably came from Japan in boxes of tea; also that it was found a little later some forty miles from Charleston, and soon after at Macon, Georgia, and that it has now become naturalized as far west as Texas and north to the Ohio River. It has taken possession of the rocky Ozark hills, and furnishes an ample supply of nutritious forage in a region that was, previous to its arrival, devoid of green food for stock. It is eagerly eaten by the cattle and hogs that range through the woods, and they are not only kept in good condition by it during summer, but with the addition of the mast that is abundant, they come off the range in the fall fat enough for market. Milch cows also live on it.

Japan Clover is less attractive on dry or poor soil and where it is eaten over by stock than when grown under better conditions. In a fairly favorable location it makes luxuriant growth and becomes really ornamental. Indeed, its beauty and its ability to adapt itself to various conditions of light, shade, drought and moisture in this limestone district are leading to its trial as a lawn covering, particularly in shaded grounds where grass is especially unsatisfactory. It is certainly invaluable in the Ozarks.

Pennyroyal neatly clothes with a subdued color acres of high, dry and stony land where no other herbaceous plants try to live. The plants extend for miles along the roadways, and all of this refreshing aromatic herbage is wasted.

Indian Currant (*Symphoricarpos vulgaris*, locally known as Buckberry) forms another noticeable and abundant crop, occupying situations similar to those in central Illinois which are overgrown by Hazel bushes, and in about the same proportion. It is, in fact, the leading shrub, largely predominating in the undergrowth of southern and south-western Missouri, where but few Hazel bushes are seen. Sumach is not plentiful, and Elder is almost unknown. The wild growth of the Indian Currant furnishes many suggestions for its use in cultivated grounds in the same region. It forms fine, irregular belts and large straggling plantations at the verge of open glades and along the border of woodlands; and in sunny situations, even on hilltops and steep hillsides it is seen in clumps and single well-grown plants, springing from stony soil and set among boulders and on projecting ledges of rocks. These plants frequently attain good proportions, and the gracefully drooping branches sweep the ground on all sides. Everywhere among the hills this desirable shrub is seen loaded with its small dark red berries.

Brighton, Ill.

Fanny Copley Seavey.

The Beautifying of a Neglected Field.

To the Editor of GARDEN AND FOREST:

Sir,—I am indebted to GARDEN AND FOREST for the beautifying of at least one of my fields. This was a barren, worn-out hillside of gravel with deep, worn gullies when I bought the place. Following your advice, I allowed it to grow up as it would; I knew that Pines and Junipers would soon cover it. They come up everywhere of themselves, and are now spread over nearly the whole field; they are from ten to fifteen feet high. But it surprised me, in looking over the field this fall, to find Maples, Sassafras, Gum, Tulip and Sycamore trees, and one Holly, besides two kinds of Ferns, three patches of *Arbutus* and some Crowfoot. The Daisies, Golden-rod, Sumach and Grasses were not to be wondered at. Simply left alone, this is now quite a pleasing field to me. The farmers about think it sadly neglected, but I thank you for advising such neglect.

St. Denis, Md.

Cynthia Force.

Flowering Plants in a Mild Autumn.

To the Editor of GARDEN AND FOREST:

Sir,—The season has been kind to us here, notwithstanding excessively dry weather in the early fall. My notes record the flowering of Crocuses on the 30th of March, and in sheltered parts of the city there have been no killing frosts yet. *Nasturtium* leaves are bright and are still growing, and there are occasional flowers. Now and then a small *Polyantha* Rose shows on the bushes, and the last Dahlias are gathered along with the yellow *Chrysanthemums*.

This is remarkable for the 11th of November, and is an especial encouragement to those who desire to cultivate late-blooming flowers. The tardy but ambitious *Cosmos* was never so perfect as now and almost justifies its more general cultivation. Where frosts are to be expected in September there is not much satisfaction to be had from it. *Fuchsias* are bright, but stopped flowering early in the month, and *Geraniums* have become mere foliage plants. The influence of Lake Erie is so potent in certain localities on its shore that unless there are contending influences of elevation or closed depressions that hold the cold air there is not much fear of frost before November, and yet the season of most plants is past some time earlier, and flower gardens have a lifeless appearance even before the trees have shed their leaves. This is especially true of the wild garden. There are enough late-blooming plants in common cultivation to maintain a cheerful appearance throughout the season, and where frosts hold off very late, as they do in some favored localities, efforts should be made to cultivate a fair proportion of these late-blooming plants.

Not much life is left in the wild garden after the Asters and

Golden-rods are gone, and not a few of these are under the ban on account of their disposition to spread by means of stolons or subterranean roots and choke out everything near them. This is also true of most of the Solomon's Seals, and *Potentilla Anserina* spreads like a Strawberry and neglects to send up its solitary bright yellow flower unless the soil is quite sandy. The *Trilliums*, Bloodroot and many other early bloomers are as unobtrusive as they are beautiful, while it is an unattained art so far to persuade the *Dicentras*, *Hepatica* and *Claytonia*, as well as some wild members of the Mint family, to continue in the garden long, as they demand soil that is mostly leaf-mold. The most satisfactory wild plant to me is *Thalictrum dioicum*, especially the male plant, which is a Maiden-hair Fern with all the improvements of perfect hardiness, bushy growth and the added wealth of pendent yellowish stamens that dance in the breeze. Another charming plant is *Uvularia grandiflora*, which is in every way worthy a place in the most pretentious garden.

Buffalo, N. Y.

John Chamberlin.

A Delicious Tuber.

To the Editor of GARDEN AND FOREST:

Sir,—Having read of the edible character of the roots of *Apios tuberosa* I was curious to find out what they were like. This beautiful wild plant, clambering over the wayside shrubbery in many parts of rural New England, with its luxuriant habit and the exquisite scent of its chocolate-colored flowers, is familiar to all who know the country. But its curious tubers, strung along the underground shoots like beads on a string, are not so commonly known. I had used the plant to cover a bare wall near the house, and the other day I dug up a few of the tubers. They were about the size of small Seckel pears. I noticed that, even when slightly cut, or pricked, they exuded a gum-like juice, white and sweetish, something like India-rubber, in its elastic nature, and not easily dissolved in the mouth. Possibly this gum might prove to have some economic value. I baked the tubers in the oven for about fifteen minutes and found them delicious. When done they were mealy and creamy white in color. Their flavor was strikingly delicate; something between that of a very fine potato and a sweet potato, with a suggestion of the chestnut, also. If farmers and market-gardeners would take pains to cultivate *Apios tuberosa* they would undoubtedly make handsome profits, for the tubers would be in demand both as a novelty and as a welcome addition to our edible vegetables. It is not unlikely that, with cultivation, new varieties would be developed, perhaps approaching the sweet potato in size, and possibly even improving upon the present flavor.

Malden, Mass.

Sylvester Baxter.

The Forest.

Forestry in Women's Clubs.—I.

SOME account of the meeting of the New Jersey State Federation of Women's Clubs, held in Trenton in March, 1896, was given in GARDEN AND FOREST (vol. ix., page 132), with reference to the efforts made on that occasion in the interests of forestry. Mrs. John Gifford, of Princeton, made the principal address, and explained the forest conditions of New Jersey, together with the special beauties and uses of the woods of each region, and gave convincing reasons for the adoption of a conservative forest policy. It was suggested that women could aid in the preservation of forests through their influence in schools, libraries and in public discussions; by offering prizes to school children, and by having in every school district in the state exhibits of maps and photographs illustrating the results of wanton forest destruction and of scientific forest management; by joining forestry associations; in clubs and classes, by taking up the systematic study of forestry in its economic aspect; and in the sympathetic love of trees and of natural beauty and order, out of which would grow village-improvement societies, with forestry committees and the like. The prophecy was ventured by the speaker that if the women of New Jersey would take a positive and active interest in the preservation and protection of the forests of that state, within one year a State Forest Commission would be organized, a radical and practical fire policy would be enforced, so as to save the remnants of forests, and courses of instruction would be

founded which would teach the people of the state to value the forests and to use them wisely. A feature of the meeting on that occasion was an exhibition of maps showing forest reservations in the west, and the forest area of New Jersey; views of the Palisades, in which Nature and Nature's defacements were contrasted; photographs showing the desolation wrought by criminally careless methods of lumbering; illustrations of the expensive engineering work in southern France, due to the mountains having been stripped of their forest cover. Photographs of noteworthy trees and attractive landscapes were other features of this convincing exhibit, together with pamphlets on tree-planting, forestry and village improvement, and a specially prepared pamphlet containing a bibliography of books relating to forestry, village improvement and rural life.

As an outcome of the interest manifested at Trenton, at the national meeting of the General Federation of Women's Clubs held in Louisville, Kentucky, in June, 1896, a resolution was adopted "that as federations of women's clubs and as individual clubs, as far as possible, we pledge ourselves to take up the study of forest conditions and resources, and to further the highest interests of our several states in these respects." These resolutions were afterward printed and circulated among 1,500 clubs in the United States.

The growing interest in forestry was signally shown a few weeks ago in the meetings of the Pennsylvania and the New Jersey State Federation of Women's Clubs, the first held in Harrisburg, Pennsylvania, October 27th and 28th, and the latter in Camden, New Jersey, on the 28th and 29th of the same month. On the occasion of the New Jersey meeting in the spring of 1896, GARDEN AND FOREST remarked editorially that the arrangement of the forestry exhibit was so effective that it seemed a pity that it must be transient, and the suggestion was made that every library and school-room should have something of this kind as a general help in the education of public sentiment. A partial fulfilment of this suggestion has now been realized in the formation of a traveling forestry library, arranged by Mrs. Gifford, as chairman of the committee on Forestry and Protection of the Palisades of the New Jersey State Federation of Women's Clubs, who also introduced the forestry resolution at Louisville a year ago. The library, neatly encased in oak, with a traveling dress of white duck, was a conspicuous feature of the Camden meeting. The catalogue states that the library is intended as an introduction to the study of forestry, and it is arranged in seven classes. As illustrating the range covered, Group A comprises books on Trees and Forestry, and contains *The Woods of the United States*, C. S. Sargent; *Elements of Forestry*, F. B. Hough; *Trees of the Northern United States*, Austin C. Apgar; *Management and Protection of Forests*, D. Brandis; *Forest Tree Planters' Manual*, J. O. Barrett; specimen sheets of Sargent's *Silva of North America*. Group B consists of Reports of the Division of Forestry for 1890-91-92-93; besides *What is Forestry*, B. E. Fernow; *Wasted Soils and How to Prevent Them*; *Relation of Forests to Farmers*, B. E. Fernow; *Planting in Western Plains*, *Planting in Waste Places*, *Planting on the Farm*, all by C. A. Keffer; *Age of Trees*; *Defects of Wood*, A. D. Hopkins; *Uses of Wood*, Filibert Roth. Other subjects included in this class of the library are Information to Wood Consumers; Government Timber Tests; Suggestions to Lumbermen; Facts and Figures regarding Forest Resources; Forest Fire Legislation; Is Fire Protection Practicable; Report of the Committee appointed by the National Academy of Sciences upon the inauguration of a Forest Reservation Policy; Rules and Regulations governing Forest Reserves; Public Lands and Their Water Supply; Notes Regarding Department Publications; Arbor Day Planting in Eastern States; and Some Common Birds in their Relation to Agriculture. Group C contains publications of the American Forestry Association; Group D, State publications and papers; Group E, Monographs and Short Articles; Group F, Periodicals and Press Clippings, including sets of *Forest Leaves*,

The Forester, a series of editorials, notes, etc., and a portfolio of illustrations from GARDEN AND FOREST, with specimens of foreign forestry periodicals from Switzerland, Belgium, France, Germany, Austria, India and Ceylon; also specimens of American Lumber Journals. Group G contains Reports of Park Boards, etc. The library is to be sent to women's clubs in New Jersey in the order of applications, the expense of carriage to be borne by each club, some member of which shall be responsible for its care and return at the end of a month. Several applications were at once made and the journeying promptly begun.

A circular letter constituted part of the report of the Committee on Forestry and Protection of the Palisades, and in this it was recommended that members of the State Federation see that libraries, schools and reading circles are supplied with forestry literature. The endowment of a forestry scholarship, it was suggested, would speedily lead to the establishment of a chair of forestry in colleges, and that with the approaching need for trained forestry officials in the national reservations the time is ripe for public-spirited effort in this direction. Widespread and intelligent pressure upon our rulers was recommended to overcome the selfish ends of greed, lest, as in the case of the recently declared national reservations, the nation lose control of vast resources which should be held for the benefit and welfare of all. It was specially recommended that members should thoroughly familiarize themselves with every aspect of the Palisades question, with a view to their preservation. In connection with forestry interests, Waldo G. Morse, Esq., one of the New York State Commissioners for the Preservation of the Palisades, made an impressive plea for the Palisades, the address being distributed later in pamphlet form. Miss Vermilye, of Englewood, New Jersey, gave a graphic account of the actual damage resulting from blasts in quarrying the Palisades. In the verbal report of the chairman of the Forestry Committee it was stated that interest in forestry is steadily growing. It was explained that forestry is not a sentimental enthusiasm for beautiful trees in themselves, but that it is an economic science. That a forest is a crop, just as corn and wheat are crops, and exists to be utilized for the benefit of man. Forethought and complex considerations enter into the raising and utilizing of a crop of timber, which make forestry a difficult and intricate science, depending upon the varying conditions of different countries. Our vast resources and optimistic habits of thought have too long delayed the understanding of this beneficent art. Forestry must be practical and must take the financial aspect into consideration. Lumbermen most of all ought to be interested in forestry, because their future supplies are at stake. The forest is a crop and something more, and its direct and indirect benefits are as important as its cash returns. In Europe the state regulates the rotation of the timber crop according to fixed laws, and we are trying to persuade our Government to save the remnants of our vast and beautiful forest possessions, and to protect them from fire and offer inducements to woodland owners in the reduction of taxes. Popular enlightenment must be depended on most of all. Women should first intelligently inform themselves, and then devise adequate means of instruction, to the end that public opinion may become educated.

New York.

M. B. C.

Notes.

The Department of Agriculture in Circular No. 17 of the Division of Forestry has brought together in a convenient form a summary of recent legislation bearing on state forestry commissions and forest reserves, including the laws of New York, Pennsylvania, Wisconsin and Minnesota, and those sections of the Sundry Civil Appropriation Bill passed on June 4th last which relate to the national forests.

Our correspondent, Mr. Carl Purdy, whose knowledge of the bulbous plants of California and their cultural requirements is unrivaled, describes in the October issue of *Erythea* three new California Lilies; *Lilium occidentalis*, from boggy places

in barrens and bogs about Humboldt Bay, related to *L. maritima*, which it resembles in habit, bulbs, leaves, and in the dark red of its perianth tips, but from which it is separated by its much larger flowers, with long revolute lobes; *Lilium Bakerii*, with a bulb similar to that of *L. Columbianum*, is distinguished from that species by the form of the perianth and the delightful fragrance of the flowers which perfume the air for a considerable distance, and is a native of sandy woods along Puget Sound in northern Washington and southern British Columbia; and *L. parvum*, var. *luteum*, a showy form with perianth segments revolute from the base and clear brilliant reddish orange throughout, tipped with red and marked with small bright red spots. This variety is from Plumas County, where it was collected by Mrs. Austin.

Two plants of the Heath family from widely separated parts of the world, *Azalea Vaseyi* and *Enkianthus campanulatus*, were conspicuous a few days ago in the brilliant reds of their dying foliage. In the northern states this *Rhododendron*, with its lovely clear pink precocious flowers, is one of the best of our early-flowering shrubs, and at the end of October lightens up the shrubbery with its brilliantly-colored leaves. It was first figured in *GARDEN AND FOREST* (vol. i., fig. 60); and, although a native of North and South Carolina, where it was discovered only a few years ago, it has proved perfectly hardy in eastern Massachusetts. *Enkianthus campanulatus*, the representative of a small genus of southern and eastern Asia, is one of the most beautiful flowering plants in Japan. In its native forests it is a tree occasionally thirty feet high, with a trunk sometimes a foot in diameter covered with smooth light red bark, and abundant campanulate *Andromeda*-like white flowers borne in elongated, many-flowered, racemose panicles. Raised in the Arnold Arboretum from seeds gathered by Professor Sargent in 1892, it has so far proved hardy in the climate of Massachusetts, although, of course, it is too soon to form any opinion of its real value as a garden plant in this country. During the last week of October the plants in the Arboretum were particularly noticeable from the brilliant color of the leaves.

The Rural New-Yorker, in explaining the long-keeping qualities of New York state grapes, says that grapes, apples and other fruits grown in western New York have superior keeping qualities, due to the soil and climatic conditions. Grapes grown on clay-land are firmer and ship better than those grown on gravel. In Ohio an association known as the Clay-growers' Association handle only grapes grown on clay-lands. The three sections in New York where grapes are grown to the greatest perfection all lie near large bodies of water, an influence favorable to keeping qualities. Of the long list of varieties cultivated in this state the best of the long-keeping kinds are Catawba, Diana, Isabella and Vergennes. To insure keeping they must be carefully handled; it is also important that the temperature be gradually reduced from the vines to cold storage, and there must be no sudden changes. The grapes should be left out-of-doors in crates the night after they are picked; early in the morning they should be removed to a cool building or dry cellar; then to a still cooler room adjoining the storage-room, and here the temperature should gradually fall until the desired point is reached. New York grapes intended for exhibition at the World's Fair were placed in cold storage November 1st, 1892, and held there until spring, when they were shipped to Chicago in time for the opening of the Fair, May 1st. The main supply was then placed in the cold-storage building on the exhibition-grounds. This building was destroyed by fire on July 12th and the reserve stock of grapes was lost, otherwise New York grapes would have been on exhibition every day of the Fair. As it was, but fifteen days intervened between the last showing of cold-storage stock and the arrival of new-crop grapes. Catawba grapes are offered at reasonable rates in the markets of this city as late as April.

The Gardeners' Magazine in a recent issue states that the development of the great industry which has been founded on the beet has been possible only in consequence of the progressive increase in the yield of sugar by the roots. In order to obtain exact information on the subject application was made by the Kew authorities to Monsieur H. L. de Vilmorin, who has had a large share in bringing the beet to its present condition as a commercial source of sugar. In reply Monsieur de Vilmorin wrote to Mr. W. T. Thiselton that both his father and himself had devoted much time and attention to sugar beets. Both the beet-root and the leaf-beet are derived from *Beta maritima*, L., a native of the shores of the Mediterranean and of the western coasts of Europe. It was known to the ancient Greeks and Romans in both garden forms. In the eighteenth century large varieties of the beet-root were transferred

from the garden to the field and used as food for cattle, first in Germany, and afterward in France and Great Britain. When Achard initiated the manufacture of sugar from beet-root the white field variety was judged the most suitable for sugar-making; it contained from eight to ten per cent of its weight in pure sugar. Selection was then brought to bear on the existing variety, and in fifty years the percentage of sugar was slightly increased, being raised to twelve or thirteen per cent of the gross weight of the root. After 1850 more accurate means of ascertaining the amount of sugar in each individual root were introduced by the elder Vilmorin, and in a dozen years a race was established yielding sixteen and even eighteen per cent of sugar. The fibrous tissues of the root which hold most sugar had been developed and the cellular tissues reduced to the utmost extent; hence the root became small, hard, dry and easily deformed. Since then the object has been to unite a better shape with an equal amount of sugar. Beet-roots containing more than eighteen per cent of sugar cease to vegetate properly and die.

No more beautiful fruit has ever been seen in our fancy-fruit stores than the Spitzenberg apples, from California, now shown in the best collections. The fine crimson streaks are laid on a flush of a lighter shade, with clear lemon-color showing through in places. The aroma of this apple is delightful, and the flavor and texture are both excellent. These are a specialty with W. & C. Smith, the pioneer fruiterers in this city, at 84 Broadway. Other attractive offerings in their uncommonly interesting display are immense *Easter Beurre*, *Comice* and *Beurre d'Anjou* pears, which range from seventy-five cents to \$1.00 a dozen, and spicy winter *Seckels* from fifty to seventy-five cents. *Coe's Late Red* plums are still shown in good condition, and cost seventy-five cents for a six-pound box. Among California grapes are *Cornichon*, *White Muscat*, *Morocco* and *Verdelle* at seventy-five cents for six pounds. *Almeria* or *Malaga* grapes, from Spain, cost forty cents a pound, and there are hot-house *Gros Colman* grapes. *Persimmons* have recently arrived from Florida, after a scarcity of this fruit during the past month; these are of unusually large size and in their best condition; they cost \$1.00 for a box containing one dozen and a half of the fruits. *Grapefruits*, from Florida, cost \$2.00, and oranges from the same state sixty to seventy-five cents a dozen. *Abakka* pineapples command sixty to seventy-five cents each. While the supply of fresh fruits is no less showy in variety and color than earlier in the season, the buyer has, besides, a wide choice of fruits preserved in various ways. Many of these are imported as, *Guava jelly* and a syrup of the same fruit, besides *Guava paste* and *marmalade*, from Florida and the West Indies; the latter costs twenty-five cents a pound. *Lime-juice* syrup also comes from the West Indies, while a comparative novelty in our city, *Tamarind* syrup, comes from the East Indies by way of the Netherlands, and costs fifty cents a bottle. *Blood orange phosphate* is a popular fruit syrup, used for making a drink, and costs twenty-five cents a bottle. Neat and attractive glasses of *Bar-le-Duc*, red currants and white currants preserved separately, and costing twenty-five cents a package, and *Cerises au Marasquin*, the bright-colored French cherries in syrup, from Bordeaux, are among the imported attractions in glass, while slender glass jars containing strikingly handsome fruit, are labeled with the name of the Fabrikant and of the fruit in good German, with no suggestion, however, of where the fruit is put up. These glasses show French *marrons*, cherries glacé in vanilla syrup, strawberries, plums, prunes and pears, all of one kind, or assorted in the same jar. The chestnuts are imported; the choice fruits are grown in America, and are preserved in a rich syrup in this country by an experienced German. These jars, weighing one and a half pounds, cost forty-five cents, and two and a half pound packages readily command seventy-five cents. Assorted glacé fruits, from France, in neat paper boxes holding one pound, cost sixty cents, and two-pound boxes of glacé apricots cost \$1.25. A section of stem with *Muscat* dates attached fills a box which holds a pound; this costs twenty-eight cents. *Royal Locoum* pulled figs sell for twenty cents a pound, and the best pressed figs bring the same price. The grade known as *Extra Natural* figs, from Turkey, in their original plump form, realize thirty cents a pound. French prunes sell at twenty-five cents, Russian Imperial cluster raisins, at thirty-five cents, and Arabian dates, seeded, and stuffed with almonds, walnuts or pecan nuts, at thirty cents a pound. Preserved Canton ginger, in five-pound jars, costs sixty cents. Among many domestic and foreign nuts, salted *Pistachio* nuts, in the partly open shells, are the most interesting. These sell for fifty cents for a half-pound package.

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Poisonous Mushrooms.

THE two cases of poisoning from eating *Amanita muscaria*, one terminating fatally, which occurred recently in the city of Washington, tend to strengthen the belief that it is almost hopeless to expect that the time will ever come when a knowledge of the distinctive marks of our common poisonous fungi will be so widely spread that serious accidents need not be feared. The victim in this case was Count de Vecchi, a man of intelligence, educated in Italy, and supposed to be well informed about edible and poisonous fungi. Furthermore, there was evidence to show that he had in his possession and had apparently recently consulted a pamphlet in which the dangerous *A. muscaria* was described and figured, and yet, in spite of all this, he deliberately selected that poisonous species for his table. If Count de Vecchi could be thus mistaken, what could be expected of persons of less education and experience?

The present case should serve as a warning in several respects. In some parts of the country there has sprung up suddenly a mania for fungus-eating, which has been carried to such an extent that not a small number of persons have convinced themselves that nearly all our larger toadstools are not only not injurious, but really palatable. It is, of course, useless to question what is a matter of taste, but when it goes so far that it is seriously maintained that even *A. muscaria* is edible, as is claimed by some enthusiastic mycophagists, the present fatal case is decidedly instructive. The determination of the fungus was made by experts of the Agricultural Department, and it cannot be supposed that they were not familiar with this common species. Even were it true that *A. muscaria* is sometimes poisonous and sometimes not—and it should be borne in mind that this assumption has never yet been shown to be a fact—the present case shows that it certainly is not a species to be eaten.

As articles of food fungi belong to a quite different category from that of other substances. In the case of meat the butcher knows what he is about when he sells, and his customer in buying knows that, however he may be cheated as to price and quality, he is not purchasing what may kill him in a few hours. Fungi are rather to be

compared with drugs in an apothecary's shop, where, with some which are harmless, are others which are highly poisonous, and none but persons of special training are allowed to dispense them. The danger of mistake through ignorance is recognized and the conditions of the sale of drugs are regulated by law. In countries where fungi are largely eaten the danger of mistaking harmful for harmless species is recognized, and experts are appointed to examine fungi offered for sale. So far the comparative exemption from fungus-poisoning in this country has been due to the fact that dealers have been afraid to sell, and purchasers to buy, anything but the cultivated mushroom, *Agaricus campestris*, or, perhaps, in a few eastern cities, *Coprinus comatus*. This caution has been carried so far that, a few years ago, a gentleman in Washington who raised large quantities of a delicious native species closely resembling the common mushroom, was obliged to abandon the culture on a large scale because no dealer could be persuaded to buy his fungi in spite of their close resemblance to the ordinary mushroom.

Considering the increasing fondness for fungi in this country and knowing that it is next to hopeless to suppose that persons who are fond of eating fungi will be able to become experts in distinguishing edible from poisonous species, the time seems to have arrived when the sale of fungi should be controlled by law. During the winter months, especially in the northern states, practically nothing is sold but the cultivated mushroom, and there is no need of restricting the sale at that season. But during the summer months when, in some parts of the country, it is the custom for farmers and others to bring to market fungi which they have found growing wild, they should be compelled to sell their goods only at authorized places and authorized hours, and there should be appointed experts to examine all fungi sold. The experts could be paid wholly or in part by fees received from those selling fungi. This system has worked well in parts of France and Italy, especially in towns of moderate size. In very large cities, as a rule, the variety of fungi offered for sale is smaller than in towns situated in rural districts. Although we advise the appointment of expert examiners, the advantage to be derived thereby will not probably be so great as in countries like France and Italy. There fungi form a larger portion of the food of the poorer classes than with us. In this country the greatest danger at the present time is that the upper and middle classes, with whom it is becoming more and more the fashion to collect fungi in the fields and woods for their own consumption, will, perhaps, trust too much to chance and exceed the bounds of ordinary prudence. We are, perhaps, warranted in believing that the amateur fungus collector of the present day is attracted not altogether by the intrinsic value of fungi as food, but finds a certain pleasure in the knowledge that he is running some risk of being poisoned. However that may be, there is good reason why the sale of fungi should be guarded by law in the interest of those who neither pretend nor can be expected to have any clear knowledge of the species which may be offered for sale.

Notes on Cultivated Conifers.—IX.

MOST of the Pines with thickened cone-scales and coarse-grained resinous wood produce their leaves in clusters of two or of three with persistent sheaths. There is, however, a small group of this section with leaves in from one to five leaved clusters and deciduous sheaths, and to this belong the so-called Nut Pines or Piñons of the arid regions of the south-western United States, northern Mexico and Lower California. There are four of these Nut Pines, all inhabitants of the United States and all small, round-topped trees, with rigid spinescent leaves, small globose cones of few scales and large edible seeds, which furnish to some of the desert Indians their principal supply of food; and they all grow in company with desert Junipers in regions too dry for other trees. Two of the Nut Pines,

Pinus monophylla of the deserts between the Rocky Mountains and the Sierra Nevada, and *Pinus edulis* of Colorado, Utah, New Mexico and Arizona, live in the eastern states, but grow here very slowly, giving little promise of ever emerging from their strictly pyramidal juvenile form or of producing cones. The former is interesting morphologically, as it is the only Pine-tree (with the exception of a monstrous seminal form of the European *Pinus sylvestris*) with leaves which generally appear solitary by the very early suppression in the bud of one leaf of a two-leaved cluster.

In this group, too, may be placed two alpine Pine-trees of western North America, with leaves in five-leaved clusters crowded round the ends of the branches in dense brushes, and fitly called Foxtail Pines by the miners, who often use their short stout trunks for props in the mines. The first of these trees, *Pinus Balfouriana*, from northern California, has probably not been tried in the eastern states, but the other, *Pinus aristata*, which is widely scattered at high elevations from the outer range of the Rocky Mountains of Colorado to the southern Sierra Nevada and to the San Francisco Peaks in northern Arizona, was raised in 1862 by Dr. Asa Gray in the Harvard Botanic Garden from seeds collected by Dr. Parry on Pike's Peak. A few of these plants are still left in the neighborhood of Boston, and now at the end of thirty-five years are from twelve to eighteen inches in height and interesting only in the evidence which they afford of a remarkable tenacity of life under adverse conditions.

In the group of Pine-trees with leaves in clusters of three are some of the most important timber-trees of the whole genus, like *Pinus palustris*, the southern Pitch Pine, the most valuable of all the Pines, *Pinus Taeda*, the Loblolly Pine of the southern states, and several Mexican, Californian and Indian species. None of these, however, is hardy in the northern states, where only a few of the three-leaved Pines can be successfully cultivated. The best-known here is the native Pitch Pine (*Pinus rigida*), which is widely scattered from New Brunswick and the northern shores of Lake Ontario to northern Georgia, and from the seacoast to the western slopes of the Appalachian Mountains. This tree is valuable because it can be raised more quickly and cheaply in the northern states than any other conifer from seeds scattered broadcast on the ground or sowed in shallow drills; and no other conifer grows here so rapidly on dry sterile gravels, which it soon covers with dense forests. It is often valuable, too, where the soil is poor, as an ornamental tree, and in old age it frequently becomes extremely picturesque with its dark red-brown roughened and deeply fissured bark, contorted branches and sparse dark yellow-green rigid leaves which stand out stiffly from the branchlets. To this section of the genus also belongs *Pinus ponderosa*, one of the largest and most majestic of all Pine-trees, and one of the most widely distributed and variable of the North American species. As a rule, *Pinus ponderosa* and its varieties have not proved satisfactory in the eastern states. The long-leaved California forms are not hardy in New England, although I have seen in the Hudson River valley two or three healthy specimens from thirty to forty years planted. The form of the interior of the continent (var. *scopulorum*) with short leaves in two and in three leaved clusters and small cones is hardy in the neighborhood of Boston, where it is impossible, however, to keep it alive more than a few years at a time, owing to a fungal disease which disfigures and soon destroys it. The variety *Jeffreyi* (the *Pinus Jeffreyi* of many authors), a large tree of the dry parts of northern and eastern California, with long blue-green leaves and large cones, is more successful here, although healthy plants are not common. This tree appears quite hardy in the neighborhood of Boston, but the best specimens probably in the eastern states are in Delaware Park, Buffalo, where eight trees planted in 1871 vary in height from twenty-five to thirty-seven feet, with stems measured at one foot above the ground varying from one foot nine

inches to three feet nine inches in circumference. There are two healthy plants of this variety, also, about twenty-five feet in height, in Central Park, New York, near the greenhouses on the east drive. This handsome and distinct tree can therefore, perhaps, be used here more freely than it has been, although like the green-leaved forms, it will probably always suffer more or less from fungi.

The only other Pine with leaves in clusters of three which we can hope to see established in our northern gardens is the north China Lace Bark Pine (*Pinus Bungeana*), a tree with a stout trunk divided not far above the ground into several upright secondary stems, smooth pale bark separating freely into thin scales like those of a Birch or an *Arbutus*, and stiff rigid yellow-green leaves. This tree is very hardy in eastern Massachusetts, where, although still retaining a bushy habit, it produces fertile cones in abundance. Probably the largest and handsomest specimen of the Lace Bark Pine in the eastern states is in Mr. Josiah Hoopes's pinetum at West Chester, Pennsylvania (see GARDEN AND FOREST, vol. vi., p. 458).

Among the Pines with leaves in clusters of two there are a number of species which are hardy in the northern states and among them are a few good park trees. The most valuable for our plantations is the Red or Norway Pine (*Pinus resinosa*). This is a tree of the far north, ranging southward only to eastern Massachusetts, where it occurs in a few small isolated groves, the mountains of Pennsylvania, and central Michigan, Wisconsin and Minnesota. In its best state the Red Pine is a tall-stemmed tree one hundred and fifty feet in height, with a trunk five feet in diameter, although more usually it does not attain much more than half that size. In the beauty of its long dark green, lustrous leaves and light red bark, and in its rapid growth it excels all the Pitch Pines which are hardy here, although a climate colder even than that of eastern Massachusetts is required to develop all its beauty. Botanically this tree is interesting as the only American representative of a peculiar Old World group of species of which the so-called Scotch or Rega Pine (*Pinus sylvestris*) is the best known in this country. This is the great timber Pine of Europe, where it is widely spread over the continent and over Russian Asia, often forming vast forests on sandy northern plains. Grown under the best conditions in its native countries, *Pinus sylvestris*, with its tall trunk covered with light red bark and picturesque crown of short and often contorted branches clothed with pale blue-green leaves, is one of the handsomest of the Pines. It was introduced into the United States early in the present century, and, unfortunately, nurserymen have found it a profitable tree to raise. Its value, like that of a good many other foreign trees which can be easily and quickly grown in nurseries to marketable size, has been extolled far and wide, and it has been largely planted all over the northern states as an ornamental tree and to form wind-breaks on the prairies and plains of the central west. Experience has shown, however, that although *Pinus sylvestris* grows in America while young with great rapidity, producing seedlings spontaneously, it soon dies from the attacks of disease and boring insects, so that trees more than thirty or forty years old are rare in this country. In European nurseries a number of monstrous forms are propagated; the most distinct of these is the variety *pumila*, a small compact shrub, the variety *fastigiata*, with erect branches, and the variety *monophylla* on which the leaves are solitary. There are also cultivated forms with leaves marked more or less conspicuously with white and with yellow, and others with pendant branches or otherwise different from the normal in slight peculiarities.

The Austrian Pine, which is now generally considered a variety of the *Pinus Laricio* of southern Europe, has also been largely planted in the northern states as an ornamental tree. It grows here very rapidly, and, although less beautiful than the native Red Pine, in youth it is a handsome tree of good habit and rapid growth with long dark green rigid leaves. Easy to raise, the Austrian Pine, like the Scotch Pine, has been too much praised by Ameri-

can nurserymen, who find quicker profits in growing these European Pines than they do in raising the native White and Red Pines, for the Austrian Pine, although it lasts some time in good condition rather longer than the Scotch Pine, generally succumbs to the attacks of boring insects before it has lost its bushy juvenile habit, and an Austrian Pine in the United States more than fifty feet high is exceptional. The more slender-leaved Corsican Pine, the typical *Pinus Laricio*, is a handsomer tree, which has not proved hardy in New England. It may be occasionally seen in the middle states, but there is no evidence, however, in large or old specimens that this tree will really become a valuable acquisition for American plantations.

Pinus montana, also known in its different forms as *Pinus Mugho*, *P. uncinata* and *P. Pumilio*, is a subalpine plant of the mountains of central Europe, where it grows at elevations between 4,000 and 7,500 feet above the sea-level. Sometimes rising into a small tree, the Mountain Pine is more often shrubby in habit, with many stems decumbent below and erect above, forming broad clumps generally five or six feet in height and densely clothed with stout, rigid, dark green leaves. This plant is usually more successful in the northern states than the other European Pines; very hardy and comparatively free from the attacks of disease and insects, it is often useful for the decoration of rocky banks and knolls.

Of the value of the two eastern Asiatic two-leaved Pines introduced into this country it is too soon to speak, as they have been grown here for only twenty-five or thirty years. The first of these trees, *Pinus Thunbergii*, the Kura-matsu or Black Pine of Japan, inhabits northern China and Corea, and is extensively cultivated in Japan, where it is probably not indigenous. It is a tree sometimes eighty feet in height, with a trunk three feet in diameter and a broad head of stout, contorted and often pendulous branches, stout dark green leaves not unlike those of the Austrian Pine, and conspicuously white branch-buds. This is a favorite tree with the Japanese, who plant it on sandy coast plains and along the borders of their principal highroads. It is also used to cover arbors and to hang over the sides of moated walls, and is seen in every garden, where it is frequently dwarfed and trained into fantastic shapes. *Pinus Thunbergii* is perfectly hardy in New England. The Aka-matsu, or Red Pine of Japan (*Pinus densiflora*), is common in the mountain forests of the central part of the empire, and is seventy or eighty feet in height, with a slender trunk covered with light red scaly bark and thin light green leaves. Although an exceedingly picturesque and beautiful tree, it is rarely used by the Japanese as an ornamental plant, although it is a common inhabitant of their artificial forests. This tree, which often appears in our gardens under the name of *Pinus Massoniana*, a name which belongs to a south China species, is hardy in New England, where it produces fertile cones in profusion and is already beginning to assume its mature picturesque habit. So far as can be judged by an experience of twenty-five years, this appears to be the most promising of the two-leaved Pines introduced into the eastern states from foreign countries.

Other two-leaved Pines which are perfectly hardy in the northern states are *Pinus Virginiana*, better known, perhaps, as *Pinus inops*, the Jersey or Scrub Pine, *Pinus pungens*, the Table Mountain Pine, *Pinus echinata* (or *mitis*) and *Pinus divaricata* (or *Banksiana*). These are all eastern American species of no particular ornamental value. The least attractive of them, perhaps, is *Pinus Virginiana*, an inhabitant of the middle Atlantic states, and perfectly hardy in eastern Massachusetts. Scrubby generally in appearance, it is a valuable tree in its ability to cover rapidly sterile and worn-out soils in the middle Atlantic states. *Pinus pungens*, usually called the Table Mountain Pine from a locality where it grows in Pennsylvania, is an Appalachian species which naturally does not grow north of Pennsylvania. It is very hardy in New England, but has little to recommend it as an ornamental tree but its large,

massive, abundant cones. *Pinus echinata*, the short-leaved Yellow Pine of the south, is one of the most valuable of all timber Pines, supplying from the pineries of the upper districts of the southern states, and of Arkansas immense quantities of valuable lumber. It finds on the Atlantic coast its most northerly home on Staten Island, New York. This noble tree exists in the Arnold Arboretum, but evidently is not yet at home here. *Pinus divaricata*, which is the most boreal of the Pine-trees of eastern America, although it attains its greatest size and beauty only in far northern regions, flourishes in eastern Massachusetts, and is always interesting, if not beautiful, with its short, stout, falcate leaves spreading from the base, and erect cones incurved to the branches.

The Lodge Pole Pine (*Pinus contorta*, var. *Murrayana*), which grows over all the mountain ranges of the north-western and central mountain regions of the continent, and is the most widely distributed of the North American Pines, is chiefly interesting in the power of its seeds, securely guarded in tightly closed cones until fire releases them, to germinate on burnt soil. Thanks to this power, the Lodge Pole Pine has been able, not only to maintain itself against the inroads of fire, but to increase the area of its possession until it seems destined to become in the future the sole inhabitant of western forests. Introduced from Colorado into the Arnold Arboretum about twenty years ago, the Lodge Pole Pine has proved hardy and produced its cones here, but, like other dry country conifers, it suffers from fungal diseases and gives no promise of permanent success.

C. S. S.

Autumn Fruits in the Pines.

AS autumn advances in the Pines the fruits are continually disclosed, and show a wealth of color only equaled by the many-hued leaves of the trees and shrubs. The bright scarlet-red fruit of *Ilex verticillata* is to be seen everywhere in the low thickets, and of *I. lævigata* also, though it is less common. The fruit of the latter species ripens before that of *I. verticillata*, and is also larger and more scattered on the limbs and twigs. The foliage is still green on both species, and the showy berries are specially beautiful among the leaves. The Ink Berry (*I. glabra*) with evergreen leaves and black fruit, is abundant in all damp places in the Pines. Our American Holly (*I. opaca*) is unusually attractive this fall. The berries are not as brilliant as those of the deciduous members of the genus, but the handsome foliage, which remains as long as the fruit, more than compensates for the less vivid color.

Magnolia glauca is one of our best and most abundant trees. It is almost an evergreen in the Pines, and young trees especially hold their leaves until late spring. Its handsome cone-like red fruit has appeared all summer long and still shows here and there among the large, shining dark green leaves. The Flowering Dogwood, too, is yet holding its clusters of bright red drupes, more attractive even than its showy flowers. A wealth of Rose hips decorate the low bushes along country roadsides and in out-of-the-way places, and in the damp Pines the tall Swamp Rose (*Rosa Carolina*) reaches above our heads and is thickly set with its flattened globular fruits. One form of *Pyrus arbutifolia* has red berries, which it still retains, and these will provide winter feasts for the birds. The orange-colored pods of the Bittersweet (*Celastrus scandens*) are now opening, and disclose the bright scarlet seeds. A few years ago *Smilax Walteri* could have been seen here with its red fruits, but it has disappeared from this locality and its former home is now occupied by cultivated plants.

Among handsome trailing vines seen here, which bear bright fruits now, is the Cranberry (*Vaccinium macrocarpon*). Among the clean, damp sphagnum it sometimes has berries of the deepest crimson, while others are light red, and some are white on one side and deep pink on the other. Long stems bearing this multicolored fruit are sin-

gularly ornamental when mingled with the glossy leaves of neighboring low shrubs. Here and there we find dense patches of the creeping Partridge Berry (*Mitchella repens*) with small, round leaves strung along the stem in pairs, interspersed with the scarlet double berries. Both leaves and fruit remain fresh and bright all winter long. The Creeping Wintergreen (*Gaultheria procumbens*) with its red aromatic fruits and shining fragrant leaves, is common in the damp Pines.

Not only red fruits abound at this time, but many others of less conspicuous color, though equally handsome, are found in the Pines. The fruit of the Bayberry (*Myrica Caroliniensis*) covered with white wax and mingled with its fragrant leaves, is ornamental and pleasant to handle. These dry, waxy nuts are a favorite food of birds at this season. In my wild garden there are several groups of these shrubs, the stems of which early in autumn were almost covered with the white drupes. But the birds settled on the bushes in flocks and stripped them clean, not leaving a berry; the fragrant leaves will remain all winter.

The berry-like blue fruit of the White Cedar (*Cupressus thyoides*) is also ornamental. Its sweet pleasant taste attracts robins, bluebirds and cedar birds, which often eat all the fruit on a tree before cold weather sets in. The black fruit of *Smilax Bona-nox* is quite effective mingled with its shining green leaves, and so is the fruit and foliage of several other species of this neglected genus.

The Fringe-tree (*Chionanthus Virginica*) has small olive-like fruits which remain green most of the summer, and take on a purple hue late in the season. These remain in autumn until the birds take them, but they are less greedily eaten than many other fruits. The Virginia Creeper has been beautiful all through the fall with its crimson foliage and clusters of bluish black berries, which the birds specially like. The Common Tupelo (*Nyssa sylvatica*) is still magnificent with bright crimson leaves and oval bluish fruit in clusters on the end of a slender stem. The Frost Grapes are highly ornamental in the right place. The leaves have a delicate texture and are deeply lobed and bright green on both upper and lower surfaces.

The fruits of some of the Persimmon-trees in the Pines ripen in September and October, and are excellent, with no astringent taste. On most of the trees the fruit is not edible until after exposure to sharp frost, and even then it is not so pleasant tasting as the earlier fruits. It is remarkable that this common Persimmon (*Diospyros Virginiana*) is not cultivated, for the tree and foliage are both handsome, and the fruit delicious.

The Pokeweed, which grows everywhere, can be made a most striking and effective decorative plant. With care and rich soil it will attain a height of ten feet or more. Its red stem and fine large leaves, exempt from insect depredators, are ornamental, and its long racemes of white flowers with ten stamens and ten styles are more handsome than many exotic plants which are given a place in our gardens. The blossoms appear all summer long until sharp frosts cut them off; and the racemes of rich purple berries are also handsome. Any one who cares to study the ways of birds will welcome a thriving plant of Pokeweed near his window. The birds are specially fond of the fruit, and in no way can one more readily note the behavior of the different birds than here. The bluebird has delicate manners when he dines; he is deliberate and dainty, taking a berry and then pausing and making some comment to his mate or children. The family remains united throughout the autumn and takes its meals together. The catbird has quick, jerky movements and eats more rapidly than the bluebird, but not so greedily as the robin, who gorges, and then stretches himself up in a pompous way, his red breast dyed with the purple juice. After looking about a few moments he hurriedly takes more, and only leaves the berries to go to the lawn with his head to one side, as he listens for earth-worms or white grubs, which he pulls from among the grass-roots.

Vineland, N. J.

Mary Treat.

New or Little-known Plants.

Alnus tinctoria.

UNDER this name an Alder was sent several years ago to the Arnold Arboretum by Mr. Veitch, who probably had raised it from seeds collected in Japan by Maries, as I have seen the same tree in Yezo, and the plants raised from seeds which I brought from that island five years ago are identical with Veitch's *Alnus tinctoria*, a name which, although it has been more or less used in gardens, appears to be still unpublished. On the island of Yezo this Alder is a shapely tree from fifty to sixty feet in height, with a trunk often two feet in diameter, growing there on low slopes in rich moist ground, usually at some distance from the banks of streams, which are generally occupied in southern Yezo by *Alnus Japonica*. It has been considered by the Japanese botanists Spach's variety *hirsuta* of *Alnus incana*, of Manchuria and Siberia, and it is possible that this view is correct, although, for lack of proper material, representing the different species and varieties of Asiatic Alders in American herbaria, it is impossible to form a correct idea on this subject, and the object of this note, and of the figure on page 473 of this issue, made from specimens gathered in Yezo, is to call attention to a promising ornamental tree.

The leaves of this Alder, which, until something more is known of the Manchurian species, had perhaps best be called *Alnus tinctoria*, are oblong, obtusely wedge-shaped at the base, coarsely doubly serrate, or often incisedly lobed above the middle, and clothed below with soft, close, rufous pubescence, which also covers the upper side of the slender midribs and primary veins; they are thin and membranaceous, from four to six inches long and from three and a half to five inches broad, dark green above, pale below, and are borne on stout petioles an inch and a half in length. The flowers I have not seen, but the buds of the staminate catkins are an inch and a half long and a third of an inch broad, and are borne on stout peduncles from one-third to one-half of an inch in length. The fruit is half an inch long and about a third of an inch thick, so that the leaves, the buds of the staminate catkins and the fruits are much larger than those of any of the European or North American forms of *Alnus incana*. The stout, somewhat flattened branchlets marked by only occasional pale lenticels and covered during the winter by a glaucous bloom, and the much larger bright purple-red winter buds, appear very distinct from those of *Alnus incana*.

Several of the plants raised from seeds which I brought from Japan in 1892 are now twelve feet high, with perfectly straight stems from five to six inches in diameter at the base and furnished with well-balanced, vigorous branches. Shapely and handsome now, they look as if they would grow here to a large size and prove valuable ornamental trees.

C. S. S.

Foreign Correspondence.

Chrysanthemums.

THE annual exhibition arranged by the National Chrysanthemum Society was held this week in the Royal Aquarium, Westminster, and was open three days. In the extent of the collections and quality of the flowers it was considered to be the best exhibition ever held in London, or, indeed, anywhere else. Years ago specimen plants were the principal feature of this and similar exhibitions, but now it is almost entirely a display of cut flowers arranged either on trays, in vases, or in various floral decorations, such as crosses, wreaths, etc. I noted last year the extraordinary progress made in the Japanese section compared with the other sections, and this year the popularity of this big fantastic-flowered section is greatly emphasized. Thus, of cut flowers shown for prizes there were over one thousand blooms of Japanese varieties staged, whereas the

Incurved section numbered less than five hundred, while all the other sections together would not exceed the latter number. When it is borne in mind that the flowers of the

The crowd was always thickest in front of the stages where the Japanese flowers were, and the conversation of the thousands who visited the exhibition was generally directed to



Fig. 59.—*Alnus tinctoria*.—See page 472.

Japanese section are from eight inches to a foot in diameter, the display a thousand blooms would make can readily be imagined. And these figures do not include the large collections of blooms shown in groups by trade growers.

the enormous size, colors and other attractions of the flowers of this section.

While many of the old favorite varieties held prominent positions among the most successful exhibits, there were

many new varieties also, and some of them were voted the highest honors. A list of the varieties which comprised the premier collection of forty-eight cut blooms of the Japanese section comprises Madame Carnot, Etoile de Lyon, Mrs. W. H. Lees, Monsieur de la Rocheterie, Baronne Ad. de Rothschild, J. Brooks, Mrs. C. H. Payne, Viviani Morel, Monsieur Panckoucke, Eva Knowles, Pride of Exmouth, A. H. Wood, Lady Hanham, Simplicity, Australie, Yellow Madame Carnot, Phœbus, Mrs. Dewar, Julie Scaramanza, Mutual Friend, Mrs. G. Carpenter, Monsieur Hoste, Charles Davis, Mrs. Charles Blick, Monsieur Chenon de Leché, Australian Gold, E. Molyneux, Mrs. J. Lewis, Monsieur Gruyer, Edith Tabor, Monsieur Hoste, Lady Ridgway, Mrs. Weeks, Monsieur Ch. Molin, Colonel Chase, Sunstone, Mademoiselle M. A. de Galbert, Modesto, Madame M. Ricoud, Baron Tait, Niveus, Mrs. Briscoe-Ironside, Madame Gustave Henry, N. C. S. Jubilee, Miss Elsie Teichmann, Robert Powell, Robert Owen and Viscountess Hambleton. This collection was shown by Mr. W. Mease, gardener to A. Tate, Esq., Leatherhead, one of the most successful growers and exhibitors of Chrysanthemums. The prize for six blooms of a white Japanese variety was awarded to magnificent flowers of Madame Carnot; Mrs. C. Blick being second and Madame Carnot again third. The yellow sport of Madame Carnot, called J. G. Warren, was awarded the medal for the best flower of a Japanese variety in the whole exhibition. In the class for six flowers of a Japanese-colored variety, Phœbus (yellow) was an easy first, Edith Tabor (yellow) being second and E. Molyneux (crimson and gold) third. Other Japanese varieties which were of marked excellence were Western King (white), Hairy Wonder, Elsie Teichmann and Australian Gold. The feature of the whole exhibition, however, was Madame Carnot, which was prominent in every collection, and also figured largely in the groups, fifty magnificent blooms of it being conspicuous in a most artistically arranged group of cut flowers in vases shown by Mr. Norman Davis.

The Incurved section, although eclipsed by its larger-flowered, less formal sister, was represented by some beautiful flowers. The magnificent yellow, Charles H. Curtis, was by far the best of the varieties shown, while the white Madame Ferlat, the purple Miss Dorothy Foster and the blush-white Lady Isobel were worthy companions. The premier collection of thirty-six blooms was shown by Mr. Mease and comprised the following: Duchess of Fife, Violet Foster, J. Agate, Dorothy Foster, Major Bonnaffon, Mrs. R. C. Kingston, William Tunnington, Lord Alcester, Lady Isobel, Robert Petfield, Charles H. Curtis, Ma Perfection, John Doughty, Empress of India, Lucy Kendall, M. P. Martignac, Queen of England, Violet Tomlin, John Lambert, Lord Rosebery, Golden Empress, Globe d'Or, Jeanne d'Arc, Robert Cannell, Princess of Wales, Brookleigh Gem, Empress Eugénie, George Haigh, Bonnie Dundee, Noel Pragnell, Princess Beatrice, Mrs. Hepper, Alfred Salter, Mrs. Heale, C. B. Whitnall and Miss Haggas.

The best collection of twelve varieties of the Anemone-flowered section comprised Mr. H. Gardiner, Sir Walter Raleigh, Robin Adair, Mademoiselle Cabrol, Queen Elizabeth, Nelson, Caledonia, Owen's Perfection, John Bunyan, W. L. Astor, Enterprise and Reiche Lyonnaise. Although wanting, perhaps, in those characters which make the Japanese varieties so popular, yet I consider that these Anemone-flowered sorts are the most remarkable of all the races developed from the wild Chrysanthemum, the central florets in many of them being like a compact cluster of the flowers of an Erica, such as *E. hyemalis*, surrounded by a ruff or collar of ray-florets.

The Hairy Chrysanthemums are growing in favor here, the best of the varieties raised so far, namely, Hairy Wonder, being shown in fine form in several collections of cut blooms. Other varieties shown were Princess Ena, Mrs. Godfrey, White Swan, Mrs. Dr. Ward and Vaucanson.

The single-flowered varieties have many admirers since the introduction of Mary Anderson and Jane, two of the

most beautiful of all Chrysanthemums for pot specimens. I noted the following among the cut flowers shown: Lady Churchill, quilled, brick-red and gold; Evan Cameron, white; Miss Braithwaite, deep crimson, six inches across; Mrs. B. Ware, yellow, with drooping florets; Oceania, pale blush-pink; Rev. Rambrey, crimson; A. T. Simmons, yellow. If I had to be limited to the cultivation of three Chrysanthemums I should ask for Mary Anderson to be one of them. It is charming with us this year both in the conservatory and in the open borders, where now (November 12th) it is crowded with flowers.

Specimen plants were represented by only a small number of examples, which, however, were excellent in their way, enormous half-globes or standards, with the flowers all spaced out equally and staked or wired separately. The best of them was a gigantic semiglobular plant of Colonel W. B. Smith bearing over fifty flowers, every one of which was almost good enough for the exhibition table. Madame Carnot, Gloriosum, John Shrimpton and Florence Percy were also represented by big well-flowered specimens.

Exhibitors, in London at any rate, have yet to learn how to appreciate the Chrysanthemum when grown in a more natural way. The big flowers necessary to win prizes when shown singly on trays are wonderful examples of the cultivator's art, but such flowers can only be grown at the expense of the natural beauty of the plant, which, in fact, is often made to concentrate all its energies on the production of one bloom. There is also a danger of breeders neglecting altogether the habit and leaf characters of the plant in their pursuit of the big exhibition bloom. Many of these big-flowered varieties are worthless when grown as bushes to produce a dozen or so of flowers. We want bushy Chrysanthemums for the decoration of the conservatory rather than the long-legged, one-flowered monstrosities such as one sees in the gardens of those cultivators who grow chiefly for exhibition. The thousands who now grow the Chrysanthemum, from the royal gardener to the poorest cottager, prefer a plant that is a picture as a whole rather than one that is remarkable only for the enormous size of its flower when grown on the "extension" system. However, we have plenty of varieties, old though most of them are, which serve the former purpose admirably. As *The Gardeners' Chronicle* remarks: "It seems but a few years since the first really good exhibition was held or since breeders' attempts to produce larger and more attractive flowers. But the work has gone on apace, the strides have been rapid and every one is astonished at the result."

London.

W. Watson.

Cultural Department.

Greenhouse Cultivation for Amateurs.

GARDENING, with a general collection of plants in the open and under glass, is a rather continuous experience, but when the days are shortened, the outdoor labors are past and the greenhouse made ready for a new season, there is a comparatively care-free time of a few weeks—for the amateur, at least. It is well to recognize at this season, that plants, as well as man, appreciate a rest, and patience, rather than haste, is now the proper state of mind in the matter of greenhouse treatment. Surplus artificial heat with forced growth under the present lowering skies is sure to result in weak plants with a prison-like pallor, for which a few extra flowers are no compensation, not to say anything of insects, which are sure to riot on the weaklings later.

It will suffice to define my greenhouse operations as strictly amateurish if I record that now, on November 15th, there is no fire-heat in the house. The stove has been lighted a few times, but not enough heat has yet been applied to make the plants at all tender or liable to injury by draughts of cold air. Of course, this season has been exceptionally warm, but my usual practice is to avoid all artificial heat until I am forced to start it, and wait with more or less patience for clearer skies and settled weather which midwinter is sure to bring. Like all small greenhouses, mine warms up too rapidly and cools off as suddenly; but this is a detail without serious effect on plants. No place in the world has a really constant temperature, and the insistence on fixed temperatures for plants under

cultivation is somewhat misleading. Too many flower fanciers and owners of small gardens are deterred from having a small greenhouse by the fancied expense and the supposed difficulty of growing plants under glass, this latter idea being formed from reading long detailed cultural directions for plants often grown as easily as Beans. The practical fact is, as the least reflection will show, plants under glass should be as easily and successfully cultivated as those grown in the open. Each kind of gardening has its problems. The average plant cultivated in the garden will grow fairly well without much attention, but there are numerous species which test all one's skill and patience, and are almost impossible to cultivate successfully under the unnatural conditions which prevail in the ordinary garden. In the greenhouse the problems are different, but the conditions are very much under the control of the cultivator, and any one who understands plant-growth should have fewer failures indoors than outside. Plenty of good fresh air properly warmed and a judicious use of the watering-pot are the first simple requisites to successful cultivation of plants under glass. A man whose plants are in such condition that when the ventilators are open they become covered with mildew, or when closed are infested with a crop of thrips, is outside his vocation.

Commercial flower growers force their plants and grow them at high pressure, with the one object of securing a crop. Generally they succeed, but the plants are exhausted, and it is a constant struggle with most unnatural conditions, and not a practice to be followed by the amateur, to whom individual plants are valuable, if common, and to whom repose and pleasure are somewhat synonymous. What an amateur will grow in his greenhouse is as often a matter of chance as of taste, and usually three or four times as much is grown as the house will comfortably hold. In all large towns nowadays the florists' flowers, as roses and carnations, are plentiful, and it does not seem worth while to give up the greenhouse to these. Usually it will be found most satisfactory to grow rather unusual plants or those not seen in the shops, and supplement the ordinary contents of the home with potted Dutch bulbs, to be brought in during the winter.

Insects are always with us, but they affect some plants more than others. It is scarcely ever worth while to continue to grow a plant that persistently collects most of the insects in the house, as some plants will. Palms are the only insect accumulators which I tolerate. My list of plants is apt to change from year to year, but at present there is a bench of Orchids, and some of these plants suspended; a lot of miscellaneous plants, including Begonias, Palms, Crotons, Eucharis, Grifinias, Irises, Cacti, Sedums, Marantas, to mention a few which occur to me; a few climbers; a bed of Ferns and one of Violets; and a lot of odd bulbous plants in various states of activity.

Not all the plants in this collection kept under one roof will grow into specimen plants; but they will serve to help the winter pass so pleasantly that I feel impelled to urge all amateurs to provide themselves with some structure fairly well adapted for plant-growth in winter, so that it is well lighted and properly heated. Without these conditions the cultivation of plants in winter does not seem worth the struggle. A conservatory kept cold, clammy and stagnant because there is no heat to use in keeping pure air in circulation is a most depressing example of what to avoid.

Elizabeth, N. J.

J. N. Gerard.

Autumn Protection.

TO the possessor of a garden autumn is almost as busy a time as spring, though the work is different and not so interesting. All planting should be finished by the first of November, as there is not time enough thereafter for newly-planted subjects to get established before cold weather, and there would thus be no reserve force for the plants to draw on during winter. After that date it is better to postpone planting until spring, or if plants arrive late, to store them in a cellar or other suitable place until spring.

In the garden many plants that are classed as hardy are not trustworthy in this respect. They may pass through a season or two without damage, but will be injured or killed in an unusually severe winter, or a normal winter after a wet and sunless autumn. The past two months have been favorable to the ripening off of growth made during the past summer; this is fortunate for the plants, for if the autumn had been sunless many plants would have been killed this winter.

If there is any doubt about Evergreens, Rhododendrons especially, we always protect them by placing Pine or Spruce boughs between the plants. Formerly we covered the plants

with a thatched roof of branches, but they are now too high to protect in this way. We find that if the branches are disposed through them so as to ward off the sun's rays in the early spring months scorching is prevented. The boughs should remain until after the first hot days in April, which most cultivators agree is the critical period. We bank two feet of dry forest leaves about the roots of the Rhododendrons early in November or before that time. These are not removed in spring, and the vigor the plants have taken on under this treatment is surprising. They act as a mulch to keep the soil moist. They are eventually taken down by the earthworms, and are just the kind of food that is good for the plants.

Hardy plant borders have now been trimmed of all the top growth, and this is the time to make preparations for vigorous growth next year if the soil needs replenishing. Last fall our borders were covered with about six inches of leaf-mold, as this material was at hand. It was left on this summer, and every plant came up through it with a surprising vigor. Two seasons are necessary for leaf-soil to become properly decomposed; the decomposition may be hastened by the addition of lime, but it would not then be available for use indoors for Ericaceous plants, or for Rhododendrons in the border, as lime is fatal to all plants of this order, and, in fact, to all that have fine hair-like roots. In the absence of leaf-soil, well-rotted manure may be safely used on borders; in gardens this is almost as scarce an article as leaf-mold, as it is generally desirable to use it before it reaches the stage of mere decomposed vegetable matter; but the use of any but old well-decayed material is not desirable.

It has been generally supposed that Lilies dislike manure in the soil, and these plants are often almost starved. It is true that manure should not be placed near the bulbs, as it often causes decay. This is especially true of newly-planted bulbs; these are sometimes bruised, and the elements of decay are present, and with but little encouragement become fatal. In the case of established bulbs, however, it is necessary to provide a rich stimulant to bring them into luxuriant flowering. If this is applied now as a top-dressing the improvement will be marked next year, and the application is likely to be made annually. Lily-of-the-valley beds are also now given their usual winter covering, preferably of leaf-soil. I find that a destructive fungus is likely to attack these bulbs if manure is used. A long succession of these flowers may be had out-of-doors by carefully arranging the beds with regard to exposure to the sun in spring, and by regulating the covering. We had good flowers last summer a month after the first came in, from a planting under the shade of Pine-trees, where the frost did not thaw out until late. Lily-of-the-valley is one of the few subjects that will thrive admirably under Pine-trees; I have seen them growing wild in such a location.

If Narcissus are grown by themselves in a separate border it is necessary to give them a good protective mulch. It will be found that the young shoots are well started already, and if as sometimes happens, snow and frost come late, they will even appear above the ground and be hurt when cold weather sets in, or late in spring before the arrival of genial weather. If they are covered now this will serve also as a fertilizer in spring, and will serve also to nourish the crop of annuals which will follow the Narcissus for a late summer display. Last season we planted Gladioli between the rows of Narcissus; this was even more satisfactory than Asters, or annuals which cover the ground more.

Coniferous trees and shrubs, such as the Retinosporas, Juniperus, Thuyopsis dolabrata and the Golden Yew need protection from the sun. We find these perfectly hardy in the most exposed situations if they are sheltered from the hot sun when frozen. Young trees of Sciadopitys and the Nordmann Fir are also apt to suffer from this cause. The latter will lose its leader year after year when young if not protected, and the Japanese Silver Fir (*Abies firma*) is sure to be hurt in a sunny exposure. The branches of Norway Spruces are useful as a screen and save choice trees from damage; these must be firmly placed in the soil about the tree before the ground is frozen or the storms will displace them.

Young Magnolias that have been set out recently ought to be given some shelter for a year or two. We lost almost the whole of a collection two winters ago. Well-established trees were killed to the ground in some cases, and the strong shoots now sent up are even more liable to injury. Magnolias, which are so beautiful and so hard to get established, should have shelter for a year or two after planting.

Hardy Roses are so called, we presume, because they do not die off at once the first winter. We find that a very short list will include all that are iron-clad, but the lives of Roses can be prolonged if the earth is drawn up about them at least

a foot high. This banking will also attract the snow and thus be a help. Roses are quite apt to die to the ground if they are unprotected; if straw litter is used it will attract the field mice and these are worse even than frost, for they usually girdle the plants down to the ground-level.

A garden would lose half its charm were not these precautionary measures needed. They keep us interested in the well-being of the plants, and protective measures are never lost labor. It is better to be safe than regretful, and this is the time to get on the safe side.

South Lancaster, Mass.

E. O. Orpet.

Wintering Bedding Stock.

BEDDING Stock has little decorative value at this season, and it is often a problem how to care for it without taking up too much useful space. In some instances we must propagate in the autumn to the full extent of next season's requirements. All the tricolor, as well as many bronzy-leaved Geraniums, are of slow growth, and it requires care and work to make good plants from cuttings taken in the autumn. *Nierembergia frutescens*, an uncommon but graceful little plant which gives an abundance of pale blue, saucer-shaped flowers throughout the summer, should be grown along through the winter to get good plants, and this is the case with the dwarf yellow and purple Lantanas. We take up the old plants; in time they make neat bushes and standards of these plants are a most attractive feature in the flower garden at Wellesley. The yellow variety with an undergrowth of *Nierembergia*, or dwarf Lobelia, makes an effective bed.

Plants used for subtropical effects must either be held over or propagated early to get plants large enough by planting-time. Those which need a resting season, as well as others which make little growth, can be stored in cool houses or fairly light pits. These include Grevilleas, Coprosmas, Dracaenas, Lantanas, Acacias and Australian Dracaenas. Abutilons are less hardy and need a more genial temperature. For a succession we start seeds of Dracaenas, Grevilleas and Eucalyptus after the days begin to lengthen, and put in cuttings of the other sorts. A few old plants of Salvias give us all the cuttings we need. It is not necessary to take up more room with them until spring-time, as cuttings root quickly and soon make good plants. With the common tall *Salvia splendens* we would not even take cuttings, as it is more convenient to propagate from seed, but we have a selected dwarf variety which has proved to be uncertain from seeds. Common bedding Geraniums are stowed away on shelves overhead, but not more than half of the number we need are put in, as we take the tops again in February. A very few Coleus are required to give an abundant supply of plants. Cuttings taken in the autumn are preferred to old plants, for the latter are liable to be infested with mealy bug. But by taking the tips only of plants free from insects we keep our stock clean. A few plants of *Alyssum Little Gem* will give plenty of cuttings, but these must be started at once to get a good stock of fair-sized plants. Different methods are employed to propagate these plants. Some cultivators take up old plants, divide them in spring and put them in hot beds. This is as good a plan as any, for no growth is made until they are subject to bottom-heat. Still it is little trouble to take cuttings, root them in August and hold them over on shelves in a warm house until spring. *Heliotrope* and *Ageratum* may be treated in the same way as Coleus. Cuttings put in in March make good plants. Old stools of *Heliotrope* and *Ageratum* have given us quantities of flowers for cutting during winter, and as these have been appreciated we are growing a few specially for this use. The variegated *Stevias* make pretty decorative plants for which we find use during the winter.

Verbenas, once represented by a long list of named varieties which had to be increased by cuttings taken from kept-over plants, may now be classed with Zinnias, Asters and other annuals to be sown in early spring. There are now so many fine varieties of *Begonia semperflorens* available for bedding, which can be raised from seed, that few people take the trouble to keep over old plants. I have known seeds of these to retain their vitality through the winter and come up in spring. At Newport, Rhode Island, it is quite common to find thousands of mixed seedlings in beds where these plants grew the year before. *Vinca rosea*, one of the best of summer bedding plants, comes best from seed, but the seeds must be fresh and there must be a good bottom-heat to start them. *Caryopteris Mastacanthus* has for two seasons been one of the best plants for autumn bedding. It is quite easily grown from cuttings. Dwarf blue Lobelia, once raised from cuttings, is now to be had in established strains from seed.

Wellesley, Mass.

T. D. Hatfield.

Iris alata.—This *Iris*, sometimes known as *I. scorpioides*, a south European species, is now in flower in a cool house, and marks the beginning of a new season of this great family. Its flowering is, however, sometimes anticipated by that of *I. stylosa*, a species which, while hardy in this latitude in somewhat sheltered quarters, is preferably grown under protection, for we seldom have such favorable seasons as the present for plants which flower naturally in October and November. *I. alata* is a bulbous *Iris* with thick persistent, but not perennial roots, new ones being produced each season as the new bulb is formed. It is an easily managed plant as far as the production of the first flowers, as it starts promptly into growth and flowers as well in a pot as when it is planted out, which is not the case with some of the family. The plants must, however, be carefully ripened up in the warmest and sunniest spot available. The flowers vary somewhat, but are usually light purple, marked with orange on the ridge.

Elizabeth, N. J.

J. N. G.

The Forest.

Forestry in Women's Clubs.—II.

CIVICS have in the past few years had serious attention in women's clubs, and in Pennsylvania forestry, educational interests and municipal improvements receive special consideration. As indicative of the common interest in forestry it is interesting to note that on October 27th, a day in advance of the meeting of the Federation of Women's Clubs in New Jersey, and entirely independent of the action of that body, forestry proved to be one of the most popular subjects at the annual meeting of the State Federation of Women's Clubs of Pennsylvania, held at Harrisburg.

Miss Mira L. Dock, of that city, known to readers of *GARDEN AND FOREST* through her numerous contributions in articles and illustrations, spoke on *Our Forests and Their Utility and Beauty*, and described her experiences in a recent tour of observation of woodlands in seven counties of Pennsylvania. The section visited was selected because it represented average, and not extreme conditions, and topographic observations and close study of special features were accomplished in extended drives and walks. Two conditions shown from these examinations were the extreme scarcity of good water and the unkempt condition of the hamlets, villages and towns, both conditions being due to an indifference that has almost ruined the beauty and healthfulness of many portions of Pennsylvania. Almost everywhere an interest in public improvements was noticed, and in each place some one person at least was thinking of a better water-supply, of village improvement or of the great waste of timber, and the growth of sentiment in favor of forestry was very marked. The enactment of the last Legislature of Pennsylvania regarding forest fires was universally approved, and the only criticisms heard regarding the act creating State Reservations of 40,000 acres each at the headwaters of tributaries of the Ohio, Susquehanna and Delaware rivers, were that they were not sufficiently large to insure safety from floods, and that more forest-land should be set aside.

The special interest of Pennsylvania forests in the variety, size and beauty of native trees, in rich forest undergrowth and in botanical interest was sketched by Miss Dock, who said that in the first half of the last century many interesting and valuable trees and plants, mostly from the forests of eastern Pennsylvania, were taken to England. The larger part of these were sent by John Bartram and Humphrey Marshall, both Pennsylvanians born and bred. These two men not only sent valuable American plants to Europe, but they and William Hamilton, of Philadelphia, from his country-seat, now Woodlands Cemetery, in Philadelphia, introduced into this country many valuable species from Europe, among them the Norway Maple, Horse-chestnut and Lombardy Poplar. The first Rhododendrons ever seen in England were sent from the Blue Mountains of Pennsylvania about the time that George Washington was born. Not only is the vegetation in Penn-

sylvania varied, but Pennsylvania is the great meeting-ground for species from northern and southern latitudes. The Catalpa from the west meets the Holly from the coast; the Locust and Magnolia from the south meet the White Birch and Red Spruce from Canada.

In the middle of the last century Peter Kalm, a Swede, when sent over to study forest resources in eastern America, wrote home, "They treat their forests very roughly." The forests of Pennsylvania were once considered inexhaustible, but reckless cutting, fires and floods have ravaged them. Just how inexhaustible a great forest is may be learned if we look at the new state of Washington, where last spring an act was brought before the Legislature declaring that by reason of the lavish waste of valuable timber resources, "an emergency exists," and a law for the protection of forests was presented, to go into effect immediately upon receiving the signature of the Governor.

Miss Dock said two problems of this time are: Can we restore our Forests? Can we maintain our water-supply? These questions forestry tries to answer. Forestry is not simply a love of trees, nor planting them on Arbor Day and then forgetting them, nor above all is it a science or art that would prevent the cutting of trees. An interest may develop from any of these sentiments, but above all else true forestry is business. It means treating a forest as Mr. Cary says, as a field and not as a mine. Timber is a crop that takes from fifty to two hundred and fifty years to ripen and the fields where it grows are hundreds of miles in extent and often lie at considerable elevations. A good farmer keeps his grounds in such a condition that crops may follow each other with perfect regularity, and if his farm lies at different elevations he sees to it that the wash from the upper fields shall not be harmful to the lower fields. In farming when a farm runs down it principally affects the owner. In timber cutting it is just the reverse. The loss and destruction increase in area and extent the farther one travels from a deforested country. The way to understand forestry is to avoid books about trees only, and to study topography, hard and soft rocks, catchment areas and drainage systems; to learn about such minor industries as shingle-making, wood pulp, match factories, etc.; to go into a lumber-camp and see the great expense the lumberman is put to. Then one is in a position to understand that there is a great deal to learn about the subject.

The amount of forest-products proper required in the arts and manufactures can only be faintly realized by long study and much measurement. Take one industry alone, the supply of hemlock bark for tanning purposes: about fifteen million dollars' worth of hemlock bark is needed annually in this country, and Hemlock-trees of the required size are from one hundred to four hundred years of age. Besides the great industries that require timber of large size, there are countless minor industries of which we have daily evidence in the small articles that we need continually and use thoughtlessly.

The second economic factor, water, is of equal importance with the timber supply. All forested areas serve as reservoirs for the collection, storage and slow distribution of the rainfall. Where there is forest-cover from three-fourths to four-fifths of the rainfall under ordinary circumstances percolates slowly into the earth and is returned, through springs and by transpiration, to the vegetation. In a deforested area from three-fourths to four-fifths of the rainfall is immediately carried off by streams, that from mere rivulets, may in an hour become destructive torrents, or, to quote a railway man at an up-county station, "now that the trees are cut away as soon as it rains the floods are on us." There always have been and probably always will be freshets, but what forestry tries to avert are calamitous floods. These are not only destructive to commercial interests throughout their course, but no conditions are so detrimental to health as extreme alternation of low and high water. Low standing water is favorable to the propagation of germs and high

water disseminates them to be deposited over wide areas as the water subsides. While water under certain circumstances does purify itself it should be a matter of public interest to inquire into typhoid and other fevers at the headwaters of our streams.

The great industry of mining also depletes the water-supply. Everywhere in coal mining when a new vein is opened it means the disappearance forever of any spring so situated that its waters can be diverted to this easy mode of exit. Once in the mine it becomes so impregnated with sulphur that it cannot be used afterward for household purposes, and in the mining regions, even more than in the lumber country, owing to the large population the forest-cover is needed to conserve all the water possible. Another direct source of loss to individuals and the state of Pennsylvania is the great aggregate of territory, almost four times the size of Rhode Island, of so-called agricultural land, that is yearly decreasing in value. Through the hill and mountain country everywhere roadbeds are torn out, fields seamed and scoured by the wash from nearly perpendicular farms clinging to bare slaty hilltops, and taxation for road repairs and bridge building has become a great burden. It is one of the compensations of Nature that this very land which is unfit in its present condition for agriculture affords congenial soil for some of our most valuable timber-trees to reach their best condition. The Forestry Commission and Board of Agriculture hope that private judgment and public opinion will soon see to the reforesting of these lands, so that they may in time become a source of revenue, instead of loss. In some portions of Germany instead of heavy assessments for bridge building, etc., not only the city expenses are paid, but householders actually receive dividends from the municipal woodlands.

How can a widespread interest be aroused and what of practical value can be accomplished by women's clubs? Everything may be done by taking one thing at a time, and can be accomplished by developing the now latent interest in the beauty of our forests. From an indefinite feeling and indeterminate action, we may have definite ideas and determinate activity by beginning with a study of the local and special, and in time an interest will be aroused in forestry in general. In the last century one young girl of twenty in South Carolina organized, where other planters had failed, the industry of Indigo-planting, that brought millions of dollars into her Province through her unaided pluck and determination. What may not result from concentrated effort of the Federation of the Women's Clubs of a state! Not a village or town of Pennsylvania but has in its vicinity at least some one point of beauty that fifty years from now may be lost beyond recall, which preserved now for a playground or park, would for all time be an object of pride. It is through these local interests that people can be reached and the work done.

The feeling; the raw material and the machinery are all at hand. Part of the machinery is already in motion. Railroad officials were the first to see the value of protecting and beautifying the country through which their roads pass. Public school teachers are doing a great work in their Nature teaching. It now remains for that great network of organizations—the federated clubs, patriotic and religious societies—to do their share in making the land beautiful.

In club work village improvement committees in different parts of the state have a good record, but much desirable land could not be held under existing laws by any of the societies mentioned. To meet this condition Massachusetts incorporated six years ago that noble society of Public Reservations by which the trustees hold beautiful and historic places in any part of the state; and in Massachusetts the general opinion is, that public holdings of land, by giving an interest to all citizens, are of distinct benefit, and add to the value of private holdings. Is it possible for this organization to supply the motive power still needed?

The effect of Miss Dock's address was remarkable in the

general interest it excited, not only when delivered, but in press notices and in invitations for its repetition from teachers, schools and clubs in all sections of the state. At the meeting in Harrisburg it was evident that the more serious the proposition the closer was the attention. A resolution was unanimously adopted by the Federation declaring that, "in consideration of the importance of the preservation and cultivation of the forests of our state, both as a means of maintaining an adequate supply of water and of securing a proper distribution of rainfall, thereby increasing the state's productiveness and consequent wealth, the State Federation, through its clubs and its individual members, should use every effort to arouse interest in our forest conditions and resources with a view to an intelligent understanding of the value of forest preserves and the best means of protection and cultivation."

New York.

M. B. C.

Notes.

Dr. J. N. Rose, of the United States National Museum, has lately returned to Washington from a five months' botanical expedition through Mexico, bringing with him a collection of more than fifteen hundred species. Most of the collecting was done in the states of Durango, Zacatecas and Jalisco, and in a region which, it is said, has never before been visited by a botanist.

The decadence in training wall fruits has recently been the subject of considerable discussion in several numbers of the *Journal of Horticulture and Cottage Gardener*. The reasons given for the decline of this department of English gardening during the past twenty years are reduced labor, partly caused by the depression in agriculture and in everything pertaining to land; and to the larger outlay for society expenses, the garden being usually the first department of an establishment to feel the effect of economy. Besides, the increasing lavishness in table and house decorations make an excessive demand on labor, so that the vegetables and fruits are neglected and receive only hurried and careless attention. The garden walls which were once the pride of the gardener in their orderly training, and in the health and fruitfulness of the trees, now frequently have an air of neglect and unproductiveness.

The most brilliant plant in northern gardens, now that December has come and leaves have fallen or withered, is the native Black Alder (*Ilex verticillata*), which, this season, is unusually well covered with its bright red fruits that make a brilliant show in the landscape. Almost equally brilliant are the fruits of the Japanese *Berberis Thunbergii*, which still retains a few of its scarlet leaves. This Japanese Barberry has proved to be one of the best exotic shrubs which has been introduced into this country, where it appears to be fully appreciated and is now largely planted. No other shrub carries more brilliant fruit through the entire winter, and few shrubs make a braver showing in autumn dress. Some of the American Hawthorns, too, are still brilliant, although their leaves have fallen. The most conspicuous, perhaps, is the Washington Thorn (*Crataegus cordata*), which is still loaded with its small bright orange-red fruits. *Crataegus Crus-Galli*, with less brilliantly colored fruit, is beautiful, too, until the very end of winter, and the fruits of *Crataegus viridis* and *Crataegus Carrieri* still retain all their beauty of form and color.

The *Pacific Rural Press*, in a recent issue, describes and figures the Mammoth Blackberry, a hybrid between *Rubus ursinus*, the common wild Blackberry of California, and the Texas Early, a form of *Rubus villosus*, recently obtained by Judge J. H. Logan, of Santa Cruz, the originator of the Logan berry. The Mammoth, which is a cross between two plants which produce medium-sized fruit, curiously bears berries of immense size, fruits two and three-eighths of an inch in length being common. The canes of the Mammoth are large and thickly covered with small short spines; starting early in March, they grow thick and stout until about five feet high, and then, becoming pendulous or semiprostrate, grow from twenty-five to thirty feet more during the season; late in the autumn the tips of these shoots take root. Producing no adventitious root-buds, this variety cannot be propagated by root-cuttings, and the only way to multiply it is with stolons. The Mammoth begins to grow and flower early in the spring and ripens its fruit at Santa Cruz the last of May, or some weeks earlier than the Lawton. The flavor of the fruit is described as more acid than that of the Lawton, but when perfectly ripe is said to be sweet; when cooked or canned the flavor is identical with that of the fruit of the wild California

Blackberry, which is excellent, although, owing to its poor bearing qualities, it is rarely cultivated.

For Thanksgiving-day trade, last week, tempting arrays of fruits were made in the markets and stores. California grapes were offered in large variety and of excellent quality, and, handsome with their rich bloom, these looked as fresh and crisp as when taken from the vines several weeks ago. New York state grapes, of remarkable freshness for this season, were also displayed in variety, and included good Niagaras and Delawares. Lady-apples, some red bananas, strawberries from California, cocoanuts, pineapples, Italian and French chestnuts and cranberries were all in special demand. Other favorite fruits were Florida oranges and grape-fruits, choice varieties of pears, as Winter Seckel and Comice, and showy apples. During last week 37,633 barrels of the latter fruit were received in this city for the local trade, besides 18,861 barrels for export. Other receipts of fruits last week were two cargoes of cocoanuts from Colon and Trinidad, which comprised nearly 250,000 of these fruits, and four steamers brought 60,000 bunches of bananas from Jamaica and Central America. One cargo from Kingston, Jamaica, consisted of 10,613 barrels of oranges and 665 boxes, besides other shipments of oranges from the same island. There are now on the way from the Mediterranean to this port 6,200 barrels of Almeria grapes, 3,000 boxes of oranges and 60,700 boxes of lemons. Fruits are still coming from the Pacific coast, and twenty-one carloads were sold here last week, of which nineteen were grapes. Other western fruits received were Winter Nelis pears from Oregon, Easter Beurre and other late varieties of pears from California, a carload of new crop Navel oranges from the southern part of the same state, and attractive lemons of excellent quality.

"The Cherry in Delaware" is the title of Bulletin No. 35, issued by the Delaware College Agricultural Experiment Station. In a systematic treatment of the subject, Mr. G. Harold Powell, Horticulturist and Entomologist of the station, clearly explains the classification of this fruit; the practical considerations of soil, location, distance of trees; the propagating of varieties; pruning; cultivation; injurious fungi; insect enemies; climatic injuries; handling the crop and profits. The Cherry interests of Delaware, it is stated, are confined to dooryard and garden spots, and the product is disposed of in the local markets at prices that warrant an extension of the industry. The Cherry-tree thrives best in a warm, dry, loamy soil. The sour Cherry likes more moisture and is hardier. Soils too dry can often be improved by the addition of humus and by cultural aids. The land should be plowed early in spring and receive frequent cultivation until the first or middle of July, and then be seeded to a cover crop. Sour cherries can be grown commercially in all parts of the state, but the sweet Cherry should be confined to the rolling lands of New Castle County. The orchards should be placed on an elevation sloping to the north and the fruit-buds will thus be retarded in spring. Sweet Cherries should be planted thirty feet, and sour Cherry-trees sixteen to eighteen feet apart each way. The buds for the future orchard should be selected from trees of a uniformly heavy-bearing habit, as a promiscuous selection tends to make unlike trees. Sour Cherry-trees should be pruned similarly to the Peach; sweet Cherries should have three to five main arms. Brown rot is the most destructive fungous disease and can be controlled by spraying and by picking the fruit just before it is ripe. Black aphid and curculio are the worst insect enemies. Both are most destructive to the sweet varieties, though the curculio is sometimes serious in the sour kinds. Spraying controls black aphid, and jarring the latter pest. Sun-scald and bursting of the bark are not uncommon and are due to climatic influences. They are favored by nitrogenous fertilizers, late fall growth and exposure of trunk. Care in the selection of soil and in fertilizing, and a low-headed spreading form of tree reduce the danger. Geographical varieties are as yet undeveloped. The most profitable among sour Cherries are Montmorency and Early Richmond, and among sweet varieties, Black Tartarian, Roberts' Red Heart, Napoleon, Windsor and the new Dikeman, described on page 367 of this volume of GARDEN AND FOREST. A list of varieties suitable for home use is also given. It is important that the packages for market be small and neat. The purpose of the bulletin is to awaken an interest in the cultivation of this fruit, so that it may help supplement the present products of farms in localities where it can be successfully grown. This interesting pamphlet records a practical experience in the cultivation of Cherries in sections of country where it has for years been a profitable industry, and half-tone illustrations add to the value of the text.

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City Playgrounds.

THE importance of fresh air to the inhabitants of crowded city tenement districts certainly needs no demonstration; and there are now few thoughtful persons who do not realize the necessity of providing city children with abundant and convenient opportunity to play the outdoor games which belong to their age. The value of playgrounds for the general welfare and uplifting of urban populations is so well understood in Europe that every large European city is well supplied with small parks, squares and playgrounds. London men and boys can now stretch their limbs and harden their muscles in more than a thousand municipal cricket grounds and football fields, and on innumerable public tennis courts, hockey grounds and golf links. Other large English cities are following the example set by the capital; and in Paris, Berlin and Vienna the welfare of children is provided for as it never has been before. In this country there is little stent to the money spent in cramming the youthful mind with information which is not always particularly useful to the recipients in their later practical struggles with the world, but comparatively little is done by our municipalities to make children physically strong and healthy. Almost invariably the public school-houses in thickly-settled districts are destitute of open spaces about them, or these are limited to a few square feet of brick-paved yards usually too small to hold all the children of the school, to say nothing of affording them an opportunity for exercise. Small children and girls usually play in the streets, and the large boys, if they play their games at all, are forced to make excursions to distant parts of the city, or into open suburbs which every year become more remote. American cities are growing in population at the expense of the country, and unless this movement from the country to centres of population is checked, the men and, what is more important, the mothers of the men who are going to make American democracy a success or a failure, will be largely city bred. Something, to be sure, has been done to help the boys and girls of several American cities to secure health, strength and cheerfulness, but the movement for a better provision for their physical

welfare certainly has not kept pace with municipal development in some other directions.

In this city the small parks at Mulberry Bend and Corlear's Hook, in the very heart of what is said to be the most thickly populated region in America or Europe, show what can be accomplished in a short time, and how the health and character of the inhabitants of whole districts can be improved by knocking down a few buildings and covering the space which they had occupied with grass and trees, well-graded walks and comfortable benches. New York has legislative authority to spend a million dollars a year in buying land for small parks and playgrounds, and has recently acquired a number of squares for this purpose; and in a recent report of the Mayor's Advisory Committee on Small Parks, of which Mr. Abram S. Hewitt is chairman, the laying out of thirteen additional playgrounds is recommended.

Philadelphia, where a healthy public interest in the subject has been roused by the activity and zeal of the members of the City Parks Association, a body of men and women joined together for the purpose, has purchased since 1888 about one hundred and forty acres of land for small parks and playgrounds and now has two hundred and seventy acres of public grounds outside its large park system. As compared with either New York or Philadelphia Boston is badly equipped with playgrounds in her crowded districts. The city has spent great sums of money in developing an excellent park system, with large and small country parks connected by an admirable parkway; and in Franklin Field, which is still remote from the crowded parts of the city, it has a really noble country playground. During the past year several pieces of land have been purchased by the city for playgrounds but these are mostly in too remote outlying districts to be of real value to the present generation of boys and girls; and with the exception of two north end school-houses, for which a very inadequate playground has been recently bought, no provision is made for the outdoor recreation of school-children near their schools. No good opportunity is given to boys to play baseball, football or hockey anywhere in the city proper except on the Common or anywhere outside the city nearer than Franklin Park or Franklin Field, and the Common is so much used for other purposes that it cannot safely serve now as a playground any more than Madison Square in this city or Liberty Square in Philadelphia can be properly used for games of baseball. The Charlesbank, a narrow strip of land between Charles Street and the Charles River, with its well-equipped gymnasium for boys and girls, is an excellent playground for those who are satisfied with gymnastic exercises; and small boys and girls find an opportunity to play on Charlestown Heights and in the small north end marine park. In other parts of the city there is little space for the recreation of small children, and the story of the efforts of the Massachusetts Emergency and Hygienic Association to furnish places for the little children of Boston to play during the summer months, which is printed in another column, is, to say the least, pathetic.

Even in this city and in Philadelphia, where certainly more attention has been given to this subject than in the other American cities, the full meaning of what is needed in the way of urban recreation grounds has not always been fully understood, and there is evidently some confusion in the public mind with regard to a proper distinction between small parks and playgrounds. Mulberry Bend is a small city park or square laid out with broad walks, and lawns planted with trees and shrubs; it is an attractive and beautiful spot, and it has already had an elevating and healthy influence on the community. Mothers with sick children can find there fresh air, shade, and comfortable seats, and little boys and girls can run about with more freedom on the broad, smooth asphalted walks than they can in narrow crowded streets. Mulberry

Bend, however, is in no sense a playground; it does not contain even a sand garden, the crowning joy of little children in whom the digging instinct is always strongly developed; no manly games can be allowed for there is no room for them; and if the fences which surround the lawns were taken down, the beauty and value of the turf would be destroyed in a single day. Green grass, trees and flowers, with plenty of opportunity to sit and look at them, are needed in all crowded city districts. There cannot be too many such open places; they add to the beauty of cities and to the health and enjoyment of their inhabitants, and by increasing the value of adjacent real estate increase municipal income. Who can figure in dollars and cents the value of Union Square in this city, or place a money estimate on Boston Common? But parks, large and small, useful as they are, are not the only metropolitan outdoor equipment needed for the best development of a city population, and for the children at least real playgrounds are even more important. These should be of two classes: first, small open spaces, if possible adjacent to or near school-houses, where small children can play in safety such games as suit their age and in which sand gardens and a simple gymnastic apparatus can be properly established; and second, larger grounds of at least an acre in extent where boys can play rough games in freedom. In these larger playgrounds no elaborate and expensive laying out and subsequent costly maintenance are needed. The best possible playground is a piece of perfectly level ground with nothing whatever on it to interfere with the games. A good covering of turf would be desirable if it could be maintained on a city playground, but as this is impossible a surface of fine gravel or sifted coal ashes answers the purpose. A row of border trees gives dignity to the place, and affords shade to spectators who always gather to watch the sport of boys, and where trees do not interfere with the real purpose of the ground they can be advantageously used. In every city there should be a number of such open playgrounds used only for rough games and so situated that boys need not be obliged to make long journeys to distant suburbs in order to enjoy those outdoor sports which develop a manly spirit of healthy rivalry and are the best safeguards of youth against the temptations which come from idleness and the lack of opportunity to enjoy proper rational pastimes.

The necessity of municipal action in securing playgrounds is more urgent in this country now than it has ever been before. All American cities are growing rapidly in population and pushing far out over their suburbs. Private land within a reasonable distance of crowded centres of population, on which boys are often able to play, is fast being covered with buildings, and land suitable for playgrounds is everywhere increasing in value. The American city which sets the example of a really comprehensive plan for the healthy recreation of its boys and girls will have contributed something valuable to the civilization and material prosperity of the nation; and the Mayor who is fortunate enough to be in a position to carry out such a plan need not fear the ingratitude of his contemporaries and the forgetfulness or indifference of posterity.

NOTHING has so discouraged persons who believe in the value of urban parks and realize the importance of their development along the lines of greatest utility as the action of the city of Philadelphia in allowing a corporation to establish and operate a trolley line into the heart of Fairmount Park. It seems incredible that ten Park Commissioners could have been found in Philadelphia so ignorant of their duties or so indifferent to their trust that a thing like this could have been possible, or that if the Park Commissioners had been captured by specious corporate arguments the intelligent and public-spirited people of the city could have permitted it. The most beautiful sylvan glades of the park are now noisy with the buzz of street cars. Trolley wires destroy every idea of country scenes; and the hideous iron bridge, built specially to carry this line

across the Schuylkill into the park, is a serious injury to the beautiful river drive which it crosses, and stands squarely in the middle of the fine picture which was obtained from Belmont, the commanding and most interesting point of view in the park. There are between four and five miles of trolley road in Fairmount Park, and the city has obtained nothing for the franchise which has been given to a company to destroy the greatest value of one of the largest and most beautiful of all urban parks.

It is not surprising after such an indication of public indifference to parks to find that, although more than half a million dollars is appropriated annually by the city for park maintenance and improvement, the roads in Fairmount Park are washed by gullies and often covered with weeds, that the turf is everywhere in a wretched condition, that the boundaries are unprotected by plantations, and that the trees are dying from neglect or are being ruined by overcrowding. Nor is it, perhaps, surprising that the artistic value of the wonderful Wissahickon drive, which might be made one of the most interesting park drives in the world, has been sadly marred by the hideous wooden road-houses built on city land, which appear at every turn, with no other screen before them than that afforded by the white-washed trunks of a few trees, or that its beauty is impaired by the tree-weeds which have sprung up along the banks of the river, and long neglected, are now ruining many of the noble Hemlocks for which the Wissahickon is famous, and shutting out from the drive charming bits of sylvan beauty and long reaches of sparkling waters.

If Fairmount Park and the Wissahickon are thus allowed to fall into decay, little is to be hoped from the management of Bartram's Garden on the Schuylkill, now one of the small city parks. A few years ago botanists and horticulturists in every land applauded the intelligence and public spirit of Philadelphia when it purchased this piece of ground, a spot of remarkable historical and scientific interest, for here was established the first botanic garden in the New World, and here was the house built by the hands of John Bartram and many of the trees which he had planted. The interest in this spot is more than local, for the name and achievements of Bartram are known and respected wherever botany is studied or trees are cultivated, and it is therefore more than a local misfortune that his garden is allowed to suffer from ignorant or indifferent management. The great Cypress, the glory of the garden, brought by Bartram 160 years ago from the lower county of Delaware in his saddle bag, and a vigorous tree a few years ago, is now barely alive, and many of the other trees planted by him show unmistakable signs of insufficient nourishment and excessive draining. Trees die sooner or later; but the lives of many of these might have been prolonged, the garden might have been spared the "clearing up" which has eradicated the herbaceous plants and many of the shrubs which added to its charm, and the old stone house might have been saved from the Japanese Ampelopsis which now hides its most picturesque side and seems as much out of place and as foreign to the scene as the yellow Japanese Retinosporas planted by the tomb of Washington at Mount Vernon.

Notes on Cultivated Conifers.—X.

PICEA, the Spruce, is a well-marked genus with flat or angular sessile leaves articulated on prominent bases, which become woody and are persistent on the stout branchlets, stalked terminal or axillary staminate flowers, and terminal, often elongated pendulous cones, with persistent, entire, or more or less notched scales always longer than their bracts. The Spruces are large, often gregarious forest trees with scaly or rarely furrowed bark, and pale, straight-grained, soft wood. The genus is widely and generally scattered over the northern hemisphere with about eighteen species, seven of them being inhabitants of the United States; it is well represented in Japan, and probably also in the interior of China. One of the species,

at least, is common over large areas in northern Asia, another grows only on the Himalayas, and three species occur in Europe. In *Picea* are found some of the most valuable timber-trees in the world, and in favorable climates all the species are handsome and popular park-trees.

The most commonly cultivated Spruce tree in the United States is a native of northern and central Europe, the so-called Norway Spruce, *Picea Picea* (the *Picea excelsa* of many authors). This is the great timber Spruce of European silviculturists, and in its native forests it is really a noble tree, sometimes 120 feet in height, and clothed to the ground, when not too crowded by its neighbors, with long gracefully curving branches furnished with elongated pendant branchlets closely covered with dark green lustrous leaves. Introduced into the United States early in the present century, the Norway Spruce has proved very hardy in all the northern and middle states, where it grows with vigor and rapidly for thirty or forty years, when generally beginning to fail at the top, it soon becomes thin and ragged in appearance, and healthy, vigorous Norway Spruces more than fifty years old are uncommon in this country. The introduction of this tree, as it has been planted here, in enormous numbers, must be considered a misfortune, for it is certainly not as well suited to our climate as some of the native species which nurserymen usually have neglected for this foreign tree, as, unfortunately, it can be raised very cheaply from seeds. Growing rapidly and making a good appearance while young, the Norway Spruce is popular, too, with those persons who want to produce some immediate effect with their trees, but do not realize that the vigorous young plants which they admire in the nursery are almost sure to become long before they have reached maturity such ugly ragged specimens as now disfigure nearly every public park and private estate in the northern part of this country.

A geographical variety of this European Spruce (var. *medioxima*) with shorter, thicker and more rigid leaves marked by small bands of stomata, and shorter cones with thin, delicate scales rounded at the apex, is described in vol. ix., page 273, of this journal, by Dr. Christ, who points out the relationship of this Swiss and northern alpine tree with the Siberian *Picea obovata*. This interesting form has never, I believe, been tried in our gardens, but *Picea obovata* and its variety *Schrenkiana* are now growing slowly in the Arnold Arboretum, where they are not particularly promising, although on the Altai Mountains, in northern Siberia, Manchuria and northern China, countries with climates not very unlike that of our northern states, these Spruces form vast continuous forests.

As might have been expected in the case of a tree which has been so much cultivated in nurseries, a large number of curious seminal forms of the Norway Spruce have appeared from time to time and can now often be seen in gardens. Beissner, in his *Handbuch der Nadelholzkunde*, describes fifty-six of these varieties; among them are some excellent dwarf plants like the variety *Gregoryana* and the variety *Clanbrasiliana*, which are often useful for the decoration of small gardens. The varieties *inversa* and *pendula* are interesting small trees with branches pendant to the stems, and the variety *monstrosa*, with long straggling snake-like branchlets covered with short bristling leaves and destitute of lateral branchlets, is one of the most curious and hideous of arborescent monstrosities. Several of the other described varieties are hardly distinguishable and others are merely juvenile forms which soon outgrow their peculiarities.

A much more valuable tree than the European Spruce for New England is the White Spruce (*Picea Canadensis*). This is the most boreal of the Spruces of eastern North America, where it is distributed from within the Arctic Circle to the northern borders of New England and New York, northern Michigan, Wisconsin and Minnesota, South Dakota and northern Montana. This tree, which sometimes attains a height of one hundred and fifty feet, may be distinguished by the strong fetid odor of the foliage,

the dark blue-green color of the leaves and the slender elongated cones, with thin rounded entire flexible scales. The White Spruce is a tree of the north and displays its greatest beauty only in cold countries, suffering in summer in the middle states and even in southern New England from the attacks of the red spider, which soon make the foliage thin and shabby. East of Cape Cod, however, it is the most beautiful of the Spruces which have been thoroughly tested here, dense in habit with persistent lower branches, and beautiful in color. Individuals vary considerably in the color of the foliage, however, one of the most distinct of these color forms being the tree with pale blue leaves (var. *coerulea*) which is particularly attractive. Other forms with yellow leaves and with abbreviated or slightly pendulous or erect branches are cultivated in European collections. None of those which I have seen are particularly desirable or durable.

The Red Spruce (*Picea rubra*), an Appalachian species distributed from the valley of the lower St. Lawrence River to North Carolina, although little known in gardens and rarely planted, is a first-rate ornamental tree which might well be used in the northern and middle states instead of the Norway Spruce. The Red Spruce, which has long been confounded with the Black Spruce (*P. Mariana*, see GARDEN AND FOREST, vol. x., p. 62), is a tall slender tree frequently attaining the height of one hundred feet with thin branches and dense dark green foliage. The Red Spruce, which is the timber Spruce of New England, New York and the middle states, is a slow-growing tree in the forest, and it is not improbable that the oldest trees in New England belong to this species. I have had little opportunity to observe this tree in cultivation; the few planted trees, however, which I have seen are healthy and well furnished with branches and certainly have not grown very rapidly.

The Black Spruce is a smaller and more northern tree and an inhabitant of swamps and low wet ground. With the White Spruce it ranges to the Arctic Circle, and it is more generally spread over the northern states than the Red Spruce, which is confined to elevated regions except east of Cape Cod, where it reaches the coast, and it does not extend westward to the states bordering on the Great Lakes, where the Black Spruce is very abundant. The Black Spruce is a tree of rather open habit with blue-green foliage; in cultivation it soon becomes thin and shabby, and it is probably the least desirable of all the Spruces which have been fairly tested here as ornamental trees. Several varieties are described by nurserymen with the dwarf more or less compact habit or with the foliage marked with yellow or white, which are common seminal phenomena. None of these are particularly distinct or interesting enough to preserve.

Two Rocky Mountain Spruces discovered by Dr. C. C. Parry in 1861 and first raised by Dr. Asa Gray in the Harvard Botanic Garden, have proved hardy in the eastern states. The first of these trees, *Picea Engelmanni*, which is widely distributed from British Columbia to northern Arizona, is one of the most beautiful of the Spruces. It is a noble tree often a hundred and fifty feet in height with a tall stem covered with light cinnamon-red scaly bark, and pale blue acute soft leaves. This is the timber Spruce of the high slopes of the Rocky Mountains, where it forms great forests at elevations from eight thousand to eleven thousand feet above the sea-level. Here in New England *Picea Engelmanni* grows slowly, like most trees which have been transplanted from high altitudes to the sea-level, forming a handsome narrow and very compact pyramid with its lower branches resting on the ground. The largest trees have produced a few cones here. Unfortunately, *Picea Engelmanni* begins to grow very early in the spring and therefore it is frequently injured in western Europe by spring frosts, although in northern Russia it appears to be one of the hardiest and most valuable conifers.

Picea Parryana (the *Picea pungens* of most authors), the second Rocky Mountain species, the so-called Colorado

Blue Spruce, is a tree of more restricted range, being confined to Colorado, eastern Utah, and Wyoming, growing only along the banks of streams in small isolated groves at elevations between six and nine thousand feet. This species may be distinguished from Engelmann's Spruce by its pale, deeply furrowed bark, which is unusual in this genus, by its stouter glabrous branchlets and thicker rigid sharp-pointed leaves, bright blue on some plants and dull gray-green on others, and by its larger cones. As it appears in Colorado, *Picea Parryana* is a far less beautiful tree than *Picea Engelmanni*. The lower branches are soon overshadowed by those above them and then quickly die, and trees more than fifty feet high are usually thin and ragged in the tops. This Colorado Spruce has proved very hardy on the Atlantic seaboard, where it has been largely disseminated by nurserymen, and young plants are surprisingly vigorous and very handsome. The lower branches on the oldest specimens cultivated here, however, are already beginning to die, and there is every prospect that this Spruce will prove a failure as an ornamental tree. Among the seedlings raised from Dr. Parry's first seeds is a dwarf form which is still less than three feet in height and a handsome broad round-topped bush.

Neither of the Pacific coast *Piceas* has succeeded in the eastern states. Of these the Sitka, or Tidewater Spruce (*Picea Sitchensis*), is the largest of all Spruce-trees and one of the most majestic and beautiful of our conifers. The second Pacific Spruce (*Picea Breweriana*, see GARDEN AND FOREST, vol. iii., figs. 15, 16; vol. v., fig. 102) is remarkable in its pendant branches and long slender snake-like branchlets. Young plants of this tree, which is known only in a few isolated groves on the mountains of northern California and southern Oregon, have been successfully transplanted by Mr. A. J. Johnson into his nursery at Astoria, Oregon; and others may be seen in gardens in Portland. The efforts which have been made to raise Brewer's Spruce from seeds, however, in the eastern states and in Europe have not been successful, as the seedlings have an unfortunate habit of damping off as soon as they appear above the surface of the ground; and a few small grafted plants in the Arnold Arboretum are probably the only representatives of this interesting tree in the eastern states.

Japan is rich in species of *Picea* which, except in the extreme western and northern parts of Yezo, do not grow gregariously in great forests, as they often do in other parts of the world, but are scattered, usually singly, among the deciduous-leaved trees. The Japanese Spruces which have been the longest tried in our gardens are *Picea polita* and *Picea Ajanensis*. The former is a tree with stout rigid sharp-pointed yellow-green leaves, interesting in the fact that in our climate it begins to grow later in the spring than any of the other Spruces. This tree has been cultivated in the eastern states for twenty-five or thirty years and is very hardy in eastern Massachusetts, where there are a number of shapely specimens which have produced cones abundantly for a number of years. I should have considered this Spruce a most promising ornamental tree if I had not seen it in the forests of Japan. Perhaps it grows more thriftily in other parts of the empire, but on the Nikkō Mountains near Lake Chuzengi, which is the only place where I saw it, *Picea polita* was small, stunted, and miserable in appearance with thin tops and short ragged branches.

Picea Ajanensis is usually found in our gardens under the name of *Picea Alcockiana*, a tree with four-sided leaves which grows only on the mountains of central Hondo, where it is rather local, while *Picea Ajanensis* is one of the flat-leaved species and appears to be widely spread over north-eastern Asia, from Japan to Manchuria. I did not see this tree in Hondo, but in Yezo it is the common Spruce, forming forests in the western part of the island on low swampy ground not much raised above the surface of the ocean, and growing in the central districts usually singly among deciduous-leaved trees on low rocky

hills. This is also the common Spruce-tree of Saghalin and the Manchurian coast. In the eastern United States where there are cone-bearing plants of *Picea Ajanensis* twenty-five or thirty feet in height, it is hardy, fast-growing and very handsome, with well-developed lower branches, and numerous branchlets clothed with leaves which are dark green and lustrous on one surface and glaucous white on the other. In early spring this tree is very conspicuous from the bright red color of the young branchlets when they first emerge from the buds. So far as I have been able to observe the true *Picea Alcockiana*, which should, perhaps, be called *P. bicolor*, has not succeeded in the United States and I have seen only very small plants here. *Picea Glenhi*, the fourth Japanese Spruce, first discovered on Saghalin, reaches southern Yezo and is possibly only a geographical form of the Siberian *Picea obovata*. A large number of plants of this species has been raised in the Arnold Arboretum, but they are still too small to give any idea of the value of this tree in our climate.

The curious dwarf Spruce considered by Maximowicz as a variety of *Picea obovata* (var. *Japonica*) but usually cultivated under its first name, *Picea Maximowiczii*, is perfectly hardy in the neighborhood of Boston. It is a bushy plant (the largest specimen in Mr. Hunnewell's pinetum is now from five to six feet in height) with slender cinnamon-brown glabrous twigs clothed with remote needle-shaped dark green four-sided acute leaves spreading in all directions nearly at right angles to the branch. This plant was first raised from seeds distributed about thirty years ago from the Botanic Garden of St. Petersburg. Nothing appears to be known of it in a wild state, and it has been suggested that it is a monstrous or juvenile form of some other species. As a curiosity *Picea Maximowiczii* is worth a place in collections of conifers. The beautiful Himalayan Spruce-tree (*Picea Smithiana*), which is one of the largest of the genus, is widely scattered over the mountain ranges of northern India at elevations between six and eleven thousand feet above the sea-level, and is hardy in a young state, at least, in sheltered positions in the middle states. I have not seen large trees in this country.

Picea orientalis from the slopes of the Taurus and the Caucasus is one of the handsomest, hardiest and most valuable of the exotic conifers introduced into our gardens, where it has now been successfully grown for nearly fifty years. It is a large tree of dense narrow pyramidal habit with dark green lustrous rigid leaves which are so closely pressed against the branchlets that these appear more slender than those of other Spruce-trees. Beautiful specimens of the Oriental Spruce may be seen in the neighborhood of Philadelphia, in the old Parsons Nursery at Flushing, Long Island, and in Mr. Hunnewell's pinetum. So far as it is safe to form an opinion based on an experience of only fifty years it would appear wise to plant the Oriental Spruce much more frequently in this country than has been done.

The third European species, *Picea Omorika*, an inhabitant of the mountains of Servia, Bosnia and Montenegro, is interesting in its resemblance to the Pacific *Picea Sitchensis* and some species of north-western Asia in the character of its leaves, and in the fact that it was discovered only a few years ago. This Spruce, which is described as a large tree in its native forests, has proved hardy in the neighborhood of Boston, where there are now several plants five or six feet in height. Here it is attractive in its good habit and in the color of the leaves which are straight, flat, linear-oblong, obtuse and rounded at the apex, from one-half to three-quarters of an inch in length, green and lustrous on one surface and pale on the other.

C. S. S.

Nature uses actual beauty only as a luxury; for occasional and sparing adornment, sometimes a little while in profusion, but never making it a lasting feature of any prominent objects.—*Halcyon Days*.

New or Little-known Plants.

Orchids in the South Mountain, Pennsylvania.

FOR several years the discovery of "high-towering spikes of Purple Orchis," *Habenaria fimbriata*, had been an unrealized dream, but this year, late in June, unexpectedly

plant was twenty-eight inches in height, with a flower-spike three inches in diameter and seven inches in length. In the orange *Habenaria*, owing to the greater number of flowers, the lower portion of the spike is usually withered some time before the upper part has opened, but in this specimen of *H. fimbriata* almost every blossom was more or less expanded and quite unfaded when first gathered. Lifted above the mat of moss and grass in which it was growing, it was regal and almost startling as one suddenly came upon it the first time.

This *Habenaria* is rare in that locality, probably owing to washouts in recent years along many branches of the Creek, for other Orchids growing in meadows and protected places are abundant. My assistant told me he had seen but one other specimen, and I wish that careless collectors of wild flowers might have seen the way in which he took up and carried this plant. The photograph conveys an idea of the stately habit of the plant, but fails entirely (owing to the reduced scale—only one-third the natural size) to indicate the rich fullness of its foliage, and without color it is impossible to imagine the clear translucent tone of its feathery blossoms. Purple is such a violent-sounding term to use, and yet these delicate flowers are undeniably purple, of a very pure tone, with no red apparent.

The *Habenarias* bear transplanting very well, and nothing could be more beautiful in large grounds with a running brook than a grassy point set with purple Orchis and screened from the sun by overhanging *Nemopantes*, white *Azaleas* and *Witch Hazels*.

The graceful, delicate little plant, *Pogonia ophioglossioides*, bears what Mr. Baldwin truly calls a harsh and irritating name; one of the names that has helped stifle a growing interest in many a flower lover, who with appreciation of delicate texture, exquisite color and form, has not yet mastered Greek roots. In the South Mountain the *Pogonia* is found in quantities in the latter part of June, but it is easy to miss them for their season of bloom is short. One week there is an expanse of grassy field, the next week it is starred with the lovely pink blossoms, and the following week one may look in vain for one.

Pogonia ophioglossioides is by no means always found associated with *Calopogon*, but the latter is invariably found with the *Pogonia*, and two stalks of *C. pulchellus*, to the left in the illustration on page 485, were allowed to remain in the sphagnum bed when the *Pogonias* and their concealing grasses were lifted from their swamp-meadow home, and carried sixty miles to be photographed.

The *Pogonia* is fibrous-rooted, with slender two-leaved stems usually the height of the surrounding marsh grass or seven or eight inches tall; but frequently specimens ten and twelve inches high and bearing two flowers are found. The pink color of this Orchid has been the subject of many vain attempts at description, and is to other pinks what the blue of *Fringed Gentian* is to other

blues, unforgettable but indescribable. It is a pure pink, not rose or flame tinted; of uniform tint in sepals and petals, excepting the bearded lip, which is white, with groups of epidermal cells scattered irregularly along the



Fig. 60.—*Habenaria fimbriata*.

I found three stalks growing close together on a shaded islet of the Conococheague, in the western border of the South Mountain, in Pennsylvania, and most reluctantly bore away the specimen illustrated on this page. This

veins, and the extreme delicacy of color is due to this contrasted petal.

Inquiry in several directions has so far failed to discover in this country the successful cultivation of these two associated bog Orchids, but Mr. Thomas Meehan informs me that the late Comte de Paris, an enthusiastic Orchid collector, had standing orders in this country for native plants, and reported entire success in naturalizing both *Pogonia* and *Calopogon*. It would be interesting to know what treatment they received, that we might in time have more meadows filled with this all too short-seasoned flower.

Harrisburg, Pa.

M. L. Dock.

Foreign Correspondence.

London Letter.

A NEW DENDROBIUM.—Over two thousand newly imported plants of a supposed new species of *Dendrobium* were sold by auction to-day at the instance of Messrs. F. Sander & Co. The catalogue description states that the flowers are large and produced in profusion. The labellum is broad and of a deep crimson color, the sepals and petals thick and overlapping as in the Moth Orchid, and of all shades of color. The bulbs literally bristle with old flower-spikes. This is a plant for the florist, and it will become popular, as it is a winter bloomer. The Bismarck islanders told the collector that the flowering season was December and January, which he verified from Mr. Ohlsen, the missionary. The different and quite new habitat of this species accounts for its winter flowering, and although it may bear some resemblance to the magnificent *Dendrobium Phalænopsis*, it is totally distinct from that plant. It may prove the winter-flowering companion of that species. There is a great variation among these plants. The bulbs differ so greatly that possibly more than one species is present. The collector wrote that he found the plants growing among low shrubs in almost pure sand and débris, and that the flowers were exquisite and of all shades of color, covering the shrubs with myriads of butterfly-like blooms.

LEEIA AMABILIS SPLENDENS.—This is an improvement upon the type, which was introduced from Borneo fifteen years ago by Messrs. Veitch & Sons, when it received much attention because of the rich color and elegance of its foliage, and was appropriately described as resembling a shrubby *Cissus discolor*. It failed, however, to become an established favorite, chiefly on account of its leaves losing their variegation when the plants grew to any size. I am told that in the tropics it grows to a large size and is then wholly green. I lately saw in the nursery of Mr. Bause some plants of the variety above named, which he says have so far retained the rich dark velvety green and silvery feather-like variegation when grown to a good size, and, as the band of white extends, not only along the midrib, but also along the main lateral veins, the beauty of the plant is of a high order.

THE PAMPAS GRASS AND ITS ALLIES.—This is the subject of an interesting paper by Dr. O. Stapf, of Kew, the first part of which is published this week in *The Gardeners' Chronicle*. Although fourteen species of *Gynerium* have been described, only two or three of them have ever found a place among garden plants, and only one, namely, *G. argentum*, the Pampas Grass, has become really popular. A second species, *G. saccharoides*, a native of South America, is grown at Kew and in a few other gardens. Its large, elegant plumes are extensively imported and sold for decorative purposes under the name of Uva Grass. This species differs markedly from the Pampas Grass in its tall Bamboo-like culms, which are from twenty to thirty feet high, with leaves as much as twelve feet long. A parallel case was that of the Bamboo-like *Arundo donax* and the tufted *A. conspicua*, until Dr. Stapf discovered that the latter is not an *Arundo*, but a distinct genus, which I believe he has named *Cortaderia*.

ACNIDA AUSTRALIS.—Seeds of this plant have recently been

received at Kew, accompanied by particulars of its growth and habit, as observed in the peninsular portion of the state of Florida, where it would appear to grow to an extraordinary size in a few months. It is described as an annual, making most of its growth from May to August, and ripening its fruit in September or October. In rich boggy soil its stem sometimes grows to a circumference of more than three feet, with a height of twenty-five feet and branches capable of supporting the weight of a heavy man. Specimens have been described as "thirty feet high and as big as a barrel." The trunk is described as dark crimson in color, the leaves of a shining rich green and the flower-spike pyramidal. For an annual this is a phenomenal plant. Its behavior at Kew will be watched with interest. The genus is a near ally to *Amarantus*, and there are four or five species, all American.

WINTER-FLOWERING BEGONIAS.—Three new hybrids raised from *Begonia Socotrana* and tuberous varieties have lately been distributed by the raisers, Messrs. J. Veitch & Sons. They are now nicely in flower in the Begonia-house at Kew, and are remarkable for their sturdiness of stem and closer approximation to the tuberous-rooted sorts than any other of the *Socotrana* hybrids. The flowers are large and full, fleshy, and the colors are rich. They are: *Ensign*, which has semidouble flowers over two inches in diameter borne on erect peduncles; their color is rich rose-pink; *Mrs. Heal* is dwarfier, the peduncles are numerous, erect and long enough to raise the flowers well above the foliage; they are three inches in diameter and colored deep carmine; *Myra* has long, slightly arching peduncles, and the flowers are of a bright rose-carmine color. As is the case with all the *Socotrana* hybrids, the flowers of these new ones are persistent. *B. Socotrana* is now flowering freely in the stoves at Kew.

CANNELL'S ZONAL PELARGONIUMS.—Mr. Cannell's exhibit of cut blooms of Zonal Pelargoniums was perhaps the most striking feature, outside the Chrysanthemums, at the Aquarium exhibition last week. No one has done so much to improve and popularize these plants as he, and no one appears to enter into competition with him as a grower and exhibitor of them. A table stretching across the exhibition hall was entirely filled with large pyramidal, bouquet-like bunches of flowers of exceptionally large size and lustrous colors, an altogether marvelous production for mid-November in this climate. I noted the following as the most attractive in size, form and color of bloom: *Niagara*, pure white; *Red Eagle*, scarlet, white eye; *Gertrude Pearson*, pink, white eye; *Miss E. Wilson*, pale salmon-pink, red eye; *Countess de Morella*, scarlet, large white eye; *Miss P. Routh*, salmon-pink, very large; *A. Tennyson*, scarlet; *Duchess of Marlborough*, pale salmon, darker centre, very large. I believe I have already written you some particulars of Mr. Cannell's cultural methods for these plants. The essential conditions are liberal cultivation in pots out-of-doors during summer, the removal of all flower-buds until October, housing the plants in a light greenhouse close to the roof-glass, and keeping the atmosphere dry by means of thin hot-water pipes fixed among the plants or directly over them. The plants are encouraged to make a few shoots and the flower-heads are removed as soon as the flowers are over. The difference between the Zonal Pelargonium as seen in the ordinary way and as grown by Mr. Cannell is as great as that between a half-starved Chrysanthemum and the specimens one sees at exhibitions.

London.

W. Watson.

Cultural Department.

Seasonable Work.

WE have had some wintry weather quite early this year, there having been two moderately heavy snowfalls before Thanksgiving Day, November 25th, and one or two quite severe frosts. Until November 19th, when we had our first snowfall, the season was unusually open here, and Pansies, hardy Chrysanthemums, Geraniums, Verbenas, etc., were still blooming in the open. As a rule, we can carry on outdoor



Fig. 61.—*Pogonia ophioglossoloides*—See page 483.

operations here until Christmas with a few breaks, and although the appearances are wintery at present, we may still have not a few mild days before winter sets in steadily.

Perennial borders have recently been gone over, all dead tops cut down, weeds hoed up and raked off, and a liberal coating of well-rotted manure spread over the whole. Perennials to do their best must be liberally fed. Too often they are starved. The contrast between a bed heavily mulched in late fall and one scantily supplied with manure is striking. We leave the manure on the surface to act as a mulch during the following summer, scratching it over and breaking up the lumps with an iron rake. Doubtfully hardy plants, such as *Helianthus multiflorus plenus*, *Anemone Japonica*, *Tritomas*, *Montbretias*, *Heuchera sanguinea*, etc., are protected by a few shovelfuls of half-decayed leaves. Beds containing bulbs are covered with a few inches of leaves, over which pieces of boards are laid to keep the leaves from blowing about. It is quite a common practice to see Tulip and Hyacinth beds with a heavy coating of rotted manure as protection. A lighter material is preferable, as it takes some days for the frost to leave the manure when the season breaks. The bulbs themselves are perfectly hardy; the covering is given more to keep the frost from lifting the bulbs out of the beds than as protection. Flower-beds have recently been manured and dug, and present a neat appearance for the winter. No more of this work should be postponed until spring than is necessary.

Cold frames will now require to be secured from severe frost. We pack a few inches of dry leaves about the sides of ours. By doing this and using mats and shutters we are able to keep out the most severe frosts. After the ground is frozen hard in frames containing Pansies, Polyanthus, Wallflower, etc., and seedling perennials, we pack dry leaves over the plants, airing them on all mild days and removing the leaves on the first approach of spring. Stock plants of Chrysanthemums keep well if treated in this way. Lettuce grown in frames requires care in ventilation and watering at this season, or many of the plants will rot off. The surface soil will need scratching over occasionally, particularly if any green slime appears.

Violets are doing specially well this season, less disease being apparent than for several years. Marie Louise is still much the best sort, producing more flowers than any other kind. The color is much darker than that of Lady Hume Campbell. The latter is easier to grow and is a fine sort for those who cannot succeed with Marie Louise; it requires artificial heat in winter and is of little use in cold frames. The Farquhar gives a few fine flowers, but is not so robust a grower as Marie Louise; if it is well grown no other Violet can compare with it. Princess of Wales promises to be an excellent single Violet, much superior to California and Luxonne. Once a week Violets should be looked over, and decaying foliage, runners, etc., removed. If some runners have not been put in for next year's stock it is not yet too late to start a few in boxes; these should be kept over winter in a frame. Plants raised in the past two seasons in this way have been much superior to spring-rooted ones.

Compost heaps require attention at this season. We usually prepare ours early in December. It is hardly possible to arrange for too much good compost. For potting material sods of good fibrous loam are indispensable. We place a layer of well-rotted manure between each double layer of sods; a stack prepared now should not be used before next fall. Special compost heaps are required for Roses, Carnations, Chrysanthemums and Violets. I have seen good flowers of all these plants grown from the same compost, but, as a rule, growers prefer to make some distinction. Roses thrive best in a heavy retentive loam of a clayey nature, and are not at all happy when planted in a sandy compost which Carnations rather seem to like, but which Chrysanthemums would not take kindly to. All compost heaps require plenty of manure of the best quality. Leaf-soil is most useful in compost; three years are required for leaves to rot down sufficiently to make the best leaf-mold. If they can be turned over once a year they will decay more quickly. They should never be stacked near trees which will soon fill them with a mass of fibrous roots. In collecting leaves pine-needles should always be excluded, and all sticks and twigs be thrown aside.

Gooseberries and Currants have recently been pruned and well mulched with rotted manure. Some of the strongest prunings of each kind are saved and heeled in to give a succession of stout young bushes each year. The pruning of Pears, Apples and Grapevines will be concluded as weather permits. All prunings are raked up and burned, after which a liberal dressing of manure is given. Strawberries we cover

with leaves after the ground becomes frozen hard and throw some Pea brush over the top to keep the leaves from scattering.

Where Celery is wintered in the open it should now be well protected with leaves, straw or seaweed. It is keeping well this year with us. Golden Self-blanching and White Plume provide a supply until Christmas, after which we rely chiefly on Boston Market and Giant Pascal. Any vacant patches to be used for vegetables may be manured and dug while the weather permits. This will materially lessen the strain in spring, when so many operations are pressing at one time.

Taunton, Mass.

William N. Craig.

The Pink Color in Chrysanthemums.

THE economic importance of Chrysanthemum-growing (which in this state is estimated to involve more capital than Peach cultivation) justifies the attention paid to this subject by the Cornell Experiment Station. Chrysanthemums are not yet quoted in market reports by names of varieties as Roses sometimes are, but the prices are usually given for the three prominent colors—white, yellow and pink. The various shades of pink seem to be exceedingly unstable. One of the popular commercial varieties is Fred Walz, which I have frequently seen in three or more easily distinguishable shades, although the plants seemed to be grown under very similar conditions. This variety being somewhat stiff and formal in outline, is easily ruined for artistic effect by unevenness of color. The mere fact that the pure pink of Mr. F. Schuyler Mathews's color-chart has not yet been attained in chrysanthemums is not so serious in itself, because that is only one particular shade. There seems to be an entire series of colors whose value is determined far more by the skill of the cultivator than by the variety. Amaranth, crimson, rosy pink, crimson-pink, light pink and blush-white are some of the names of trade catalogues which represent a gradation from the deepest shade of the series down to pure white, and it seems probable that any of these shades may in some cases be obtained from a single variety. Not all varieties, of course, are so highly susceptible as this, but frequently the difference is enough to make the flowers unsalable. The control of color, therefore, becomes a problem of great practical interest.

The problem is doubtless a complicated one. There seem to be at least five factors concerned, any one of which may change a pink to a white. The choice of buds is said to be sufficient in some cases. J. H. Woodford, one of Mr. Spaulding's novelties, is advertised as shell-pink from terminal, and pure white from crown-buds. Overpropagation is generally thought to weaken color. Temperature and ventilation (the two factors can hardly be separated in greenhouse practice) are advertised to produce three distinct and desirable shades in Mrs. Colonel Goodman. Mere position (in pots, beds or benches) should not in itself make a difference, but in practice it does. The effect of shade is variously stated. And most complicated of all, the food factor is known to influence color, but just how is a mystery.

Thirty-one varieties advertised as having various shades of pink were grown here under the same conditions. Fourteen gave white flowers with only a trace of pink at most in a few cases. Three others had much less color than their descriptions imply. I cannot explain such a condition. The general health of the plants was excellent. The four flowers on each plant averaged about six inches in diameter, and all the other details were entirely satisfactory.

Last year I noticed in another place some white varieties which showed pink. Among them were such important sorts as Our Mutual Friend and Marie Valteau, the latter, however, being less frequently described as pure white. The food being much richer than our own, especially in nitrogenous matter, I suspected that an extra supply of nitrogen might have called out the pink color which we had never observed in these white varieties. Mr. E. G. Hill warns his customers not to use nitrate of soda in the cultivation of certain light pink varieties, as it produces a deeper and unpleasant shade.

It was convenient to single out only two of the supposed factors this year, and the experiment has turned out contrary to my expectations. The extra amount of nitrogen did not deepen the color, but the flowers proved very sensitive to shade. Shade is said by some to deepen the color, but the reverse was true in this case. The difference was perceptible at a glance in the case of Mrs. Perrin, Madame Felix Perrin, Marie Valteau, Helen Bloodgood and Iora, and in a lesser degree with William Simpson and Maud Dean. This difference would not prevent the sale of Iora, which is usually uniform in color, whatever the shade may be. The varieties Mrs. Perrin

and Madame Felix Perrin, however, lost their characteristic, sparkling, rosy color, and were not of a salable character. Some of these varieties were shaded from the time the buds were the size of marbles until they came into full flower. Others had already burst their buds and were out an inch or more before the glass overhead was whitewashed. I know nothing about shading *Chrysanthemums* during the purely vegetative phase of their life. It seems clear, however, that during the reproductive phase the forming flowers are weakened in color by shading. There was only one contradictory plant among twenty-five. It is a common complaint among florists that the pink color stays only a few days after the flower opens, and perhaps sunlight and shade cannot then arrest the fading. The results with the nitrogen factor were not conclusive. At any rate, we did not force any pink into such white varieties as *Lenawee* and *Our Mutual Friend*.

One of the most popular of all *Chrysanthemums* is the white variety *Ivory*. It is included by many dealers in their list of twelve best varieties for commercial purposes. It is used for cut flowers and pot-plants, and still figures among the winners in the exhibitions. Naturally pink sports of it are eagerly sought after. Miss Agnes L. Dalskov (commonly called *Pink Ivory*) has been much praised elsewhere. With us it had barely a trace of color last year, and none in 1897.

Ithaca, N. Y.

Wilhelm Miller.

Correspondence.

City Playgrounds.

To the Editor of GARDEN AND FOREST:

Sir,—The Massachusetts Emergency and Hygienic Association has led the way in this country in efforts to provide playgrounds for the summer use of children, and has now under its charge in Boston eleven yards, mostly belonging to schools, at which, during the summer of 1896, there was an average attendance of 1,804 children a day. These yards, of course, are only available during vacations. The valuable Charlesbank gymnasium accommodates a large neighborhood, and I am told that the average attendance there in the summer months is above a thousand a day; but there are many sections of the city too distant for the residents to avail themselves of the Charlesbank, and to them the great park systems are wholly inaccessible, so that these sections are in sore need of some municipal provision for spacious recreation-grounds. There is also an Emergency Playroom at Morgan Chapel, Shawmut Avenue, and the Episcopal Mission has provided seven rooms, where at certain hours children can play under proper supervision. There are vacation schools connected with Denison House, and the Lincoln House Settlement is doing admirable work in providing recreation for the poor of the South End, and, no doubt, there are other private provisions for their needs, but a great deal remains for the municipality to organize and pay for.

It may be of interest to your readers to know just what is being done by the Emergency and Hygienic Association in the yards they manage so admirably, and, therefore, I subjoin an account of some of them which I had the pleasure of visiting last summer with one of their public-spirited directors.

I was taken first to South Boston, to a sort of human chicken-coop on a three-cornered piece of land between two streets, left unoccupied when the Ellis Memorial was built. This space the trustees of the Memorial were glad to put at the service of the Association, and the ground was at first enclosed with a board fence, and later with slats to admit the air more fully, and shaded with a canvas awning. This awning I found in a very dilapidated condition at the end of the summer, it having been willfully torn by mischievous boys of the neighborhood, who at first gave a great deal of trouble to the managers by forcing an entrance and terrifying the children. The intrepidity of the matrons in charge of the ground, helped by the police, put the hoodlums to flight, and the younger children are no longer molested. The doors of all the yards, however, have to be kept locked to prevent the intrusion of the unruly element, always ready to make a disturbance, and only the younger children are admitted at the proper hours of recreation. There was nothing but a dirt floor in this poor and small, but much-valued enclosure; at one end were sand piles for the smallest children, in which they played contentedly with shovels and pails. There are superintendents called matrons in all the yards, whose business it is to keep order, to teach kindergarten games and occupations to the children, to take charge of and distribute the playthings and books which are provided, to settle disputes, and to keep out intruders. These young women, mostly school-teachers who desire to supple-

ment their small salaries by work in summer, take great interest in the little ones, know their names and characteristics, and are most kind and cordial in their treatment of them. It is interesting to note that though these teachers often begin the playground work when they are weary and worn with school-teaching, they grow brown and healthy in this daily occupation in the open air, even amid such poor surroundings. Two or three times a week, and sometimes daily, the yards are visited by members of the committee, who are a court of final appeal in case of difficulty.

From this playground we passed on to a more pleasant one at the Mather School, in South Boston, which is shaded in the morning by a few street-trees and by the high buildings about it. We had found about eighty children enjoying themselves in the dreary little pen at West Second Street, but here there were, or had been during the morning, nearly two hundred, who disported themselves upon the flagged pavement outside the schoolhouse enclosed by a high iron fence. Here were also sand pens and toys, and the boys and girls proudly exhibited the work they had done with cardboard and worsteds, or the little drawings they had made. Sometimes a baby in a carriage was wheeled and attended by an older child. At stated hours plays for the little ones were conducted by the matrons; among these the flag drill was particularly enjoyed. It was interesting to note the pleased expression on the wretched, depraved faces of men of the lowest description, who paused to look through the fence when the children were in a ring playing some of the pretty kindergarten games, and one realized that the playground was a civilizing influence, not only for the children, but for the adult neighbors who looked on.

Another schoolyard in Shawmut Avenue, opposite Lincoln House, was thronged at a later hour with frolicsome happy children, and in the lower part of the schoolhouse some of the girls gathered to paint flowers from nature. While I was there flowers, sent in great baskets from the Flower Mission, were distributed among the children, to their evident joy. Several newsboys dropped in for a spare twenty minutes to enjoy a game of checkers, and weary mothers came to leave their little ones in safe-keeping. Shawmut Avenue is a dirty street, and the dust blew about in clouds, but the boys and girls swept the yard frequently, and so kept it orderly. One longed for a tree or a corner of green shrubbery or a bit of grass. The visit later on to the Charlesbank Gymnasium was restful, and it was easy to realize what it must mean to the denizens of crowded tenement-houses to have such a resort, where shrubs and trees flourish, and there is a stretch of turf to roll upon.

The Earl of Meath has said it is better for a city to have a hundred parks of one acre than one park of a hundred acres. Frequent open spaces, with plants and grass in the corners, should be scattered for the use of children all through the great cities with their crowding houses, hard pavements and noisy streets, which until lately have been the only place where the young could amuse themselves. It is pathetic to see the great enjoyment which not only the children, but the mothers, take even in the least attractive of the yards, and the refining influence of the kind and sympathetic treatment which they receive is evident both upon the children and their parents. Many of the boys are so unused to decent treatment that when they first come they are in constant dread of a blow when the matrons approach them, but after a time they become respectful and helpful, and a book to read often tames the most obstreperous.

All that the directors ask is that the city shall furnish the yards with shade-trees, of which they are sorely in need. Even the broad stretch of greensward at the Charlesbank is unavailable on hot summer days, because it is absolutely unshaded. It seems a mistake to sacrifice the comfort of the children to a landscape-design which could hardly be fatally marred by one or two trees to afford a refuge from the burning summer sun.

But the city should do more than grant this simple request; it might clear away rubbishy old buildings and give open spaces for the use of children in every quarter of the city, as the authorities are doing in London. The Charlesbank, which we owe to the Park Commissioners of Boston, was the first free open-air gymnasium in the world, and this, under the superintendence of the Massachusetts Emergency and Hygienic Association, has already in three years added noticeably to the public health. Children with tendencies to curvature of the spine, with stiffness of the joints and general ill-health have had exercises prescribed for them by the careful superintendents, and these defects have been remedied. The matrons report the growing activity and vigor of the girls, 300 of whom

are now willing to practice gymnastics, which but few would attempt in the beginning. Nearly 3,000 towels, used in the girls' bathrooms alone, show how the once "unwashed" are learning to appreciate the free baths provided for them after exercise.

Any one who would visit the playgrounds which the Association has taken such generous care of for ten years, would feel with me that it is the most touching and interesting of charities, and one that cannot be too generously aided in its good work. A contribution of one dollar is sufficient to give one child for a summer the privileges of the playgrounds and valuable instruction in good citizenship. The matrons, of course, have to be paid, and there are certain incidental expenditures for toys and implements, though most of these are free gifts, as is the sand, ten heaps of which have been distributed for ten years by one firm. The public spirit of citizens has been generous, but an enterprise such as this, now so well started, with its course so clearly indicated, should not be left to charity alone, but be made one of the duties of the municipality.

Hingham, Mass.

Mary C. Robbins.

Notes.

Professor James Troop, Horticulturist of Purdue University, was recently appointed State Entomologist by the Governor of Indiana.

During last week 1,003,900 cocoanuts reached this port on four steamers, from San Blas, San Andreas, Kingston and Port Antonio.

In the second number of *The Plant World* there is an account of Amos Eaton, one of the Nestors of American botany, accompanied by a full-page portrait.

Notwithstanding heavy rains in California, which interfered with the work of drying, the raisin product of that state for this year is estimated at 75,000,000 pounds, according to *The Fruit Trade Journal* of this city.

From three-year-old Peach orchards in the Ozark region, operated by the McNair Brothers this season, an abundant crop, of excellent quality, was produced. Eleven days were required for gathering and shipping, and the selected fruit was forwarded to eastern markets in refrigerator cars. The net returns amounted to \$165 an acre.

In the *Revue* of the Horticultural and Botanical Society of the Mouths of the Rhone, published in Marseilles, Monsieur Naudin has recently published notes on the fruiting at the Villa Thurer of *Araucaria Bidwillii*, *Jubæa spectabilis* and *Cocos australis*, a fact which will be of interest to gardeners in the warmer parts of the world.

Monsieur André in a recent issue of the *Revue Horticole* describes the new system adopted in Berlin for watering street trees by means of a number of small pits dug at some distance from their trunks and filled with perforated vertical drainpipes. The pits are covered with movable covers, and when it is desirable to water the trees these are removed and the pits filled with water, which enters the vertical drainpipes through the holes in their sides and gradually finds its way down to the roots of the trees. This system has been found very economical because none of the water is wasted, and as it reaches directly the ends of growing roots it is not necessary to water the trees frequently.

Mr. C. C. Andrews, Chief Fire Warden in Minnesota, in his preliminary report for 1897, regarding forest and prairie fires in that state, says the season of possible danger of forest and prairie fires lasted this year longer than usual, and a few fires occurred after the middle of November. The recent snowfall, though light, extended over most of the state, and probably no further damage need be apprehended this year. Dry weather prevailed over an extensive forest area about three weeks in April and May, and again in September and October. A number of fires occurred and a good proportion of them were extinguished or controlled by fire wardens and citizens who assisted them, so that no fire proved of very serious magnitude. Probably the total damage by forest fires in Minnesota this year will not exceed \$14,000. This is an improvement over last year, and considering that the standing timber in the state, at a low valuation, is worth \$100,000,000, the amount of damage is small. The principal work done under the fire-warden law is that of prevention. At a low figure the standing value of the Pine that will be cut in Minnesota this winter is \$5,000,000. When sawed into lumber at the mills its value will have increased to \$10,000,000, of which increase eighty

per cent, or \$4,000,000, represents labor. These figures only indicate in part the importance of the forest resources of the state.

The value of *Begonia Gloire de Lorraine*, as this admirable plant becomes better known in this country, is clearly demonstrated. It is a hybrid raised by Lemoine, of Nancy, in 1891, and is one of the most valuable of the long list of hybrids with which he has enriched gardens, and was obtained by crossing the winter-blooming tuberous-rooted *Begonia Socotrana* with *B. Dregei*. The hybrid, curiously enough, however, is not tuberous-rooted, but produces from the base of the stem numerous shoots which insure its rapid multiplication. This *Begonia*, with its neat habit and rather small clear green leaves, is covered from November to May with bright pink flowers, and is a delightful object with which to enliven the conservatory in winter or for table decoration. A flowering plant was figured in the fifth volume of *GARDEN AND FOREST* (page 244, fig. 48), and this *Begonia* was also described a year ago by our London correspondent (vol. ix., page 494), who speaks of it as the most popular *Begonia* in England. Although the flowers are considerably smaller than those of *B. Socotrana* and the foliage is less bold and striking, it will probably become a more popular plant than that species, as it is rather easier to manage, the flowers are numerous even on plants a few inches high, and the flowering season is much longer. In every respect this is one of the best winter-blooming plants of recent introduction.

The final importations of *Almeria* grapes for this year, received last week, showed no improvement in condition over those sold earlier in the season, many being unsound. A few barrels of choice-quality fruit in good condition reached the extreme price of \$15.00 a barrel at wholesale. The season for shipping New York state grapes has also just closed. From the grape section about Lake Erie alone 6,000 carloads of this fruit were forwarded. Last week marked the last arrivals of California grapes, when five carloads were sold here. The season for so-called deciduous fruits from the Pacific coast is now ended, and that of Citrus fruits is fairly begun. These oranges and lemons are, however, unduly hurried into market, being inferior in size and color. The orange crop of Florida for this season is estimated at 275,000 boxes. Last year's crop amounted to 160,000 boxes, and that of 1895, after the freeze, to 65,000 boxes. Four-fifths of this year's crop has already been sold by the growers, the fruit commanding \$2.00 to \$2.25 a box on the trees. The cost of wrapping, boxing, transportation, commissions, etc., must be added to these figures, and choice Florida oranges command from \$4.50 to \$5.50 a box from retail buyers in this city. Mandarins from the same state cost \$6.00 a box at wholesale, Tangerines, \$7.00 to \$10.00, and grape-fruit \$5.50 to \$6.00 a box. Among fruits recently exported were 100 boxes of Navel oranges, from California, shipped to England for the Christmas trade, a carload of pears from Oregon, and 100 boxes of California apples, to Hamburg.

Mr. William Hamilton, who, a century ago, lived at Woodlands, on the Schuylkill River, in what is now West Philadelphia, was interested in the cultivation of trees. Many exotic species were first planted in the New World in his garden, which in his time was the most famous establishment of the kind in America. Among other trees, he introduced the Lombardy Poplar and the Norway Maple into this country, and Pursh and other famous men were in his employ. Woodlands was long ago converted into a cemetery, and many of Hamilton's trees have thus been spared. The most conspicuous and interesting of these now are four plants of the Caucasian *Zelkova crenata*, probably the largest specimens of this interesting tree in America. They are comparatively low bushy trees, with short trunks about four feet in diameter, covered with smooth gray bark like that of the Beech, the small, crowded, erect branches forming dense oblong heads, which in winter, when the trees are bare of leaves, are extremely picturesque and interesting. *Zelkova*, which belongs to the Elm family and is related to *Planera*, of our southern states, consists of two species, one, the type of the genus, *Zelkova crenata*, being found only in the Caucasus and the adjacent regions, while the other species, *Zelkova Keaki*, is confined to Japan, where it is a large and exceedingly valuable timber-tree (see *GARDEN AND FOREST*, vol. vi., page 323, fig. 49). Introduced into the United States several years ago, this Japanese *Zelkova* promises to become here a large and handsome tree. The Caucasian species is less hardy, and, so far as we have observed, is only well represented in the United States by these four trees at Woodlands.

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Park-making.

THOSE who make public parks are apt to attempt too much and to injure not only the beauty, but the practical value of their creations by loading them with unnecessary and costly details. From the time when landscape-gardening was first practiced as a fine art to the present day, park-makers have been ambitious to change the face of Nature—to dig lakes where lakes did not exist and to fill up lakes where they did exist, to cut down natural hills and to raise artificial ones, to plant in one place and to clear in another, and generally to spend money in construction entirely out of proportion to the value of the results obtained.

The best art is simple in its expression, and the highest form of art in gardening is perhaps that which, taking advantage of such natural conditions as it finds, makes the best of them with the smallest expenditure of labor and money. Simplicity of design means not only economy of construction, but, what is of even more importance, economy of maintenance. The importance of making it possible to keep a great park in good condition without excessive annual expenditures for maintenance is a simple business proposition which would not seem to require much demonstration. Yet park-makers, with their unnecessary walks and drives, with their expensive buildings which are always getting out of repair; their ponds, in which there is rarely water enough to keep them fresh; their brooks, which are frequently dry; their elaborate planting schemes often ill-suited to the positions where they are wanted, make parks expensive to construct and impossible to maintain in good condition, especially in this country, where the cost of labor is heavy and there is difficulty in obtaining under existing municipal methods skilled and faithful gardeners to keep anything like an elaborate garden in good condition. The most superficial examination of any of our large urban parks will show that wherever elaborate construction and planting have been attempted they have failed from subsequent neglect to produce the effects expected from them, and that broad, quiet, pastoral and sylvan features are the only permanent and really valuable ones we can hope to attain in our great city parks.

It is needless, perhaps, to repeat what has been said so often in the columns of this journal, that, in our judgment, the greatest value and only justification of great urban parks exist in the fact that they can bring the country into the city and give to people who are obliged to pass their lives in cities the opportunity to enjoy the refreshment of mind and body which can only be found in communion with Nature and the contemplation of beautiful natural objects harmoniously arranged. Parks have other and very important uses, but this is their highest claim to recognition. If it is the highest duty of the park-maker to bring the country into the city, every road and every walk not absolutely needed to make the points of greatest interest and beauty easily accessible is an injury to his scheme, and every building and unnecessary construction of every kind reduces the value of his creation, as do trees and shrubs and other flowering plants which are out of harmony with their surroundings. Such things injure the artistic value of a park; they unnecessarily increase its cost and make the burden of annual maintenance more difficult to bear. Simplicity of design often means a saving of unnecessary expenditure, but it should not mean cheapness of construction. The most expensive parks to maintain are those which have been the most cheaply constructed, for cheap construction means expensive maintenance. Roads and walks should not be made where they are not needed, and they should not be made unnecessarily wide to accommodate possible crowds of another century, but those that are built should be constructed in the most thorough and durable manner possible in order to reduce the cost of future care. When lawns are made the work should be done thoroughly; and no tree or shrub should be planted in any manner but the best and in the most carefully prepared soil. Only as little work as possible should be done, but it should be done in the most permanent manner. The best investment a park-maker can make is in good soil, for without an abundance of good soil it is impossible to produce large and permanent trees and good grass, and the chief value of any park is in its trees and grass; and if the money which has been spent in disfiguring American parks with unnecessary buildings and miscellaneous architectural terrors had been used in buying loam, they would not now present the dreary ranks of starved and stunted trees and the great patches of worn-out turf which too often disfigure them. Only the hardiest trees and shrubs should be used in park-planting, for there is no economy in planting trees or shrubs which are liable to be killed any year, partially if not entirely by frost or heat or drought, which annually ruin many exotic garden plants, nor is it wise to use in public parks plants which, unless carefully watched, are disfigured every year by insects. It costs a great deal of money to cut out dead and dying branches from trees and shrubs, to remove dead trees and fight insects, but work of this sort must be done, unless the selection of plants used to decorate our parks is made with the greatest care. Fortunately, the trees and shrubs which need the least attention, and are therefore the most economical ones to plant, are the best from an artistic point of view; and to produce large effects and such scenery as painters like to transfer to canvas, no great variety of material is needed. The most restful park scenery, and, therefore, the best can be obtained by using judiciously a small number of varieties of the hardiest trees and shrubs, and the wise park-maker will confine his choice to those species which Nature helps him to select, and which, therefore, stand the best chance of permanent success. No park can be beautiful unless the trees which adorn it are healthy, and no tree is healthy which suffers from uncongenial climatic conditions and insufficient nourishment. Even if they are not inharmonious in a natural combination, the trees and shrubs which need constant pruning to keep them from looking shabby are too expensive for park use and should, therefore, be rejected when broad natural effects in construction and economy of maintenance are aimed for by the park-maker.

The sum of the matter of park construction is to make rural city parks less pretentious and artificial in design and to so construct them that the cost of maintenance will be reduced to the minimum. This will save money and lessen the danger of exhibitions of bad taste and encourage that simplicity which should be the controlling motive of sincere art.

MR. BINGER HERMANN, the Commissioner of the General Land Office, devotes considerable space in his first annual report to the discussion of the forest lands of the national domain and the laws under which they are administered; and among other recommendations asks for a large appropriation "to sustain a force of forestry agents to check the work of destruction," arguing in support of this proposition that a "well-managed force of agents would shortly prove more than self-supporting through the proceeds derived from the sale of timber effected by the Government."

The experience of the last twenty-five years has shown what the civil agents of the Interior Department can accomplish in protecting the property of the Government, and the utter futility of trying to enforce the laws of Congress and the regulations of the Department without the aid of soldiers, who have shown over and over again their ability to protect successfully and economically forests in the national parks from fire and pillage after the civil officers of the Interior Department had proved themselves entirely incapable of effective action. The nation's forests need protection badly enough, but it is worse than useless to attempt to protect them with the present methods and machinery of the Interior Department, and money appropriated by Congress for the purpose, unless it is to be expended in furnishing a military or quasi-military control in the forest reserves, will accomplish nothing beyond affording opportunity to the Department to pay good salaries to a few more political hangers-on. Every appropriation of this sort ought to fail.

A better idea of Mr. Binger Hermann's zeal for forest protection than can be obtained from his report will be found in the fact that largely upon his recommendation the great forest reserves of Oregon and Washington have been thrown open to sheep pasturage in direct opposition to the best advice of all scientific men, and with the full knowledge of the destructive effects of pasturage in mountain forests in this and in other countries. This is one of the things which has been done by the present administration for the protection of forests; another is the opening of 19,951,360 acres of reserved forest lands for entry and for personal and corporate stealing during a period of seven months. Discouraging as all this has certainly been, there is comfort to be found for those who believe in the importance of forest preservation in the gradual change of feeling among the people of the west themselves since the discussions which followed the publication of Mr. Cleveland's proclamations of February 22d last, and which much more than anything that has ever been done have called the attention of the public to the importance of preserving the forests of the national domain. We have always believed that the politicians in Washington who shouted the loudest against the reservations represented only a small interested class of the community which elected them, and that the persons who do not live by plundering the Government would, as soon as they understood the meaning and necessity of the reservations, be strongly in favor of them. We are glad, therefore, to find these views confirmed in a recent issue of *Forest and Stream*, which has always been much interested in forest preservation, and is usually well informed on the condition of western forests. "A recent investigation," it says, "of the state of public opinion over a very large portion of the west shows that where a short half-year ago entire communities were bitterly opposed to the establishment of the forest reserves the same communities are now heartily in favor of such an establishment. Where there was bitter hostility there is now cordial friendliness." Nevertheless, it must be borne

in mind, gratifying as this change of public opinion is, that the persons who want to despoil the public domain are rich, organized and represented in Congress, and that it will be difficult to organize the scattered forces of those interested in preserving the forests in time to make their power felt in Washington before all the really valuable forest property of the nation has been destroyed. When this has occurred, and there are no more valuable forests, and nothing more is to be made out of the public domain, the big mining and lumber companies and their Washington representatives will all favor forest preservation.

Notes on Cultivated Conifers.—XI.

THE Hemlocks (*Tsuga*) may be recognized by their slender drooping terminal shoots, flat or angled, conspicuously-stalked leaves articulated on persistent bases, which finally become woody, subglobose-stalked staminate flowers produced in the axils of leaves of the previous year, and terminal female flowers maturing in one season into small usually pendulous cones with persistent scales. Of the two sections into which the Hemlock-trees are grouped, the first, *Eutsuga*, is distinguished by its flat obtuse or emarginate leaves, usually stomatose only on the lower surface, and by small cones rarely exceeding an inch in length, while in *Hesperopeuce*, with a single species of western North America, the leaves are acute, convex or keeled above and stomatose on both surfaces, and the cones are from two to nearly four inches in length. The genus, which is now confined to North America, Japan, central China and the Himalayas, consists of seven species, two occurring in eastern North America, two in western North America, one in Japan, one in Japan and China and one in northern India. They are all large trees with thick bark rich in tannic acid and brittle coarse-grained wood.

The Hemlock which is most interesting and valuable to us here in eastern North America is the native *Tsuga Canadensis*, a large tree, generally and widely scattered from Nova Scotia to Minnesota and southward through the northern states and along the high Appalachian Mountains to northern Alabama. The Hemlock, which delights in cool northern slopes, the rocky banks of mountain streams and dark narrow ravines, is one of the most splendid inhabitants of the northern forest. Too much neglected by those who make parks and gardens in the northern states for less beautiful and permanent foreign trees, no other conifer, nevertheless, which can be used here equals it when a specimen is needed to stand alone on a lawn, and with no other tree can such dark dense masses of foliage be made here. Although usually found in the forest on northern slopes or in shaded ravines, the Hemlock will grow in full exposure to the sun; isolated trees, however, suffer from the dry cold winds of the late winter and early spring, and it is usually advisable to protect young trees by thick planting. Quick thinning, however, should follow thick planting, for the Hemlock loses its greatest charm as a lawn-tree when it is deprived of its lowest branches, which, with abundant light and air, are vigorous and long-lived, and make an isolated Hemlock-tree, with its long branches gracefully sweeping the ground, a broad-based pyramid of great beauty. Young trees, which are easily transplanted from the woods, grow rapidly in good soil into handsome specimens, and if planters could only disabuse their minds of the idea that a tree is common, and therefore should not be used in ornamental planting because it grows naturally in their neighborhood, there is no reason why this Hemlock should not become one of the greatest ornaments in all northern parks.

There are a number of abnormal forms of *Tsuga Canadensis* in gardens. The most distinct of them was found about forty years ago on the Fishkill Mountains, in New York, and was first cultivated and made known by Mr. H. W. Sargent. This plant, which is now usually called in gardens Sargent's Hemlock, is a bush about three feet high

with short pendant branches and branchlets, forming a remarkably dense, compact, flat-topped mass of foliage. Several of these plants were originally found together and transplanted, and the largest of them which I have seen is on the Howland estate, in Matteawan, New York, and is now about twenty-five feet across. This variety has been propagated by grafting the branches on the ordinary Hemlock, but in a few years the grafted plants form an erect stem and lose the dense low habit which is the charm of the original seedlings. There are a number of dwarf erect forms of the Hemlock in cultivation and others with branches a little more pendulous than ordinary. On the variety *macrophylla*, which is common in European collections, the leaves are crowded and dark green, and on the variety *albo-spica* the leaves are slightly defaced with pale markings. None of the varieties, however, with the exception of Mr. Sargent's Hemlock, have much to recommend them as ornamental plants, and usually they are prized only by lovers of vegetable monstrosities.

The second Hemlock of eastern North America, *Tsuga Caroliniana*, is distinguished from the better-known *Tsuga Canadensis* by its larger, broader and darker-colored leaves, from six to ten lines long and retuse or often notched at the apex, and by its larger cones with oblong scales longer than wide and spread at maturity nearly at right angles to the axis of the cone. The Carolina Hemlock, which grows usually on dry rocky ridges and the banks of mountain streams mostly at elevations between 2,000 and 2,500 feet above the sea-level, is distributed along the Blue Ridge from south-western Virginia to South Carolina generally in small groves, and frequently mingled with the other species. It is a beautiful tree of compact pyramidal habit, occasionally sixty feet in height, with a trunk rarely exceeding two feet in diameter, and dense dark green lustrous foliage. Sixteen years ago the Carolina Hemlock was first raised in the Arnold Arboretum, where it has proved quite hardy, promising to become here a first-rate ornamental tree. Still rare in gardens, this beautiful Hemlock is now gradually becoming known to the cultivators of ornamental trees.

The noblest of its race, at once the largest and the most graceful of all Hemlocks, *Tsuga Mertensiana* of the north-west coast, has not proved hardy here in New England, although there is still some hope that plants raised from seeds gathered in the exceedingly cold and comparatively dry interior regions of Montana, Idaho or British Columbia, to which this tree extends, may prove more satisfactory here than the plants taken from the warm wet coast region, although a first attempt made in the Arboretum with plants collected by Sereno Watson in Idaho in 1880 has not proved successful.

The second western American species, *Tsuga Pattoni*, the only representative of *Hesperapeuce*, is a tree with pendant branches densely clothed with dark green or with glaucous pale blue foliage and elongated bright purple or light green cones, which are usually pendulous, but in Alaska are occasionally erect, owing to the shortness of the much-thickened branchlets, due, no doubt, to the severity of the climate. Patton's Spruce is a tree of high alpine slopes, only reaching the sea-level, so far as is now known, in the neighborhood of Sitka, on Baranoff Island, and ranges from about latitude sixty degrees north southward along the high coast mountains, extending eastward in British Columbia to the Selkirk, and in the United States to the Cœur d'Alene and Bitter Root Mountains of Idaho and to northern Montana, and southward along the Sierra Nevada, where it is rarely seen below elevations of 10,000 feet above the sea-level. Patton's Spruce, with its drooping leading shoots and pendant branches clothed with slender waving spray which hide strength to withstand the fiercest mountain gales and the heaviest burdens of enveloping snow, is certainly the most beautiful of the alpine trees of this continent. Introduced into Europe about fifty years ago, it has proved hardy there, as it has on the Atlantic seaboard of New England. Here, how-

ever, like most alpine trees, it grows very slowly and still retains its dense pyramidal juvenile habit.

In Japan Hemlock-trees are common at high elevations, and the coniferous forests which cover the mountain ranges of central Hondo above 5,000 feet are chiefly composed of these trees and of Birches. Of the two species which inhabit Hondo, *Tsuga diversifolia* is the more northern and the larger tree. It is this tree which grows on the Nikkō Mountains above Lake Umoto (see GARDEN AND FOREST, vol. vi., f. 73), and which ranges as far north as the slopes of Mount Hakkoda, near Aomori. The second Japanese species, *Tsuga Araragi* (the *Tsuga Sieboldi* of many authors and the *Tsuga Tsuga* of others), is a more southern and a smaller tree, growing, as I saw it on Mount Komagata, in scattered groves among deciduous-leaved trees and *Pinus densiflora* and not in continuous forests. *Tsuga diversifolia*, which is frequently eighty feet in height, with a trunk three or four feet in diameter, may be distinguished from the southern tree by its darker red bark, more slender branchlets covered with fine rufous pubescence, by its shorter and narrower leaves and much smaller cones which are rarely more than half an inch in length; while the longer, broader and more lustrous leaves and smooth lustrous orange-brown branchlets of *Tsuga Araragi* serve to distinguish the southern tree before it begins to bear cones, which are nearly an inch long. (See figures 62 and 63 on pages 492 and 493 of this issue, made from plants in the neighborhood of Boston.)

The two Japanese Hemlocks are successfully cultivated by Mr. Hunnewell in his pinetum at Wellesley, where they are both hardy and where there are fine plants of *Tsuga Araragi*, the largest being about sixteen feet in height, and smaller specimens of *Tsuga diversifolia*. Most of the Japanese Hemlocks in our gardens, however, belong to the northern species, which, although probably hardier, is a less attractive tree than *Tsuga Araragi*. This with its large lustrous leaves and excellent habit is certainly one of the most beautiful of the Hemlocks which are hardy in this climate, and if it proves its ability on a longer trial to maintain itself here in good condition, it will doubtless become a popular ornament of American gardens. *Tsuga diversifolia* is a less beautiful tree than our native Hemlock, and, unless it develops qualities which it has not shown yet in this country, it will probably never be very popular here.

The Hemlock with pubescent shoots and small cones found by Dr. Augustine Henry in the province of Hupeh, in central China, is probably the northern Japanese species, although the leaves of the Chinese plant are rather longer than those of the Japanese tree.

Tsuga dumosa, the Himalayan Hemlock, is scattered from Kumaon to Bootan at elevations between 8,000 and 10,500 feet above the sea-level, and is a noble tree occasionally 120 feet in height, with a trunk seven or eight feet in diameter, and longer leaves than those of the other species. I have never seen a specimen in the United States, and in Europe the Indian Hemlock has not grown particularly well.

C. S. S.

The Cultivation of Citrus Fruits in California.

THE outlook for the Citrus-fruit growers of California for the coming season is the best in the history of the industry. The crop will be the largest. The fruit has now attained a reputation in eastern markets such as it has never had before, times are easier than at any period for the past few years, and tariff protection will give California growers an advantage not previously enjoyed. This advantage will be partially offset by a reduction of freight charges on fruit from the Mediterranean, but will still be appreciable. Under these conditions an outline of the development of Citrus-fruit culture, as a commercial industry in California, may be of interest.

Orange and Lemon trees are growing in nearly all of the counties of the state not exclusively in the mountainous sections, and many of these trees are bearing more or less fruit of very fair quality. For climatic reasons, however, the Citrus-fruit industry is and must be confined to a belt of country lying among the foot-hills of the Sierra Nevada mountains, and called the thermal belt. It stretches from San Diego to Tehama

County, a distance of over 700 miles, and varies in width from three or four miles to twenty-five or thirty. It is estimated that there are in this belt about a million and a half acres of land adapted to the safe cultivation of citrus fruits on a commercial basis, but whether all of this land is susceptible of irrigation is still undetermined.

The altitude ranges from 300 to 1,800 feet above sea-level. The mean summer temperature of this belt is somewhat higher in the northern portion than in the southern; but the mean winter temperature is higher in the southern than in the northern portion. The mean temperature for the year does not vary more than four degrees throughout the whole belt. The warmer temperature in the northern section during the growing season favors the earlier ripening of the fruit, while the warmer winter temperature in the southern section favors a safer and more general development of the industry.

All along this belt of country are especially protected or favored localities and also localities where it would be unsafe to attempt Citrus-fruit culture as a commercial enterprise. This is caused by the local topography of the country and does not depend much on the altitude. Wherever cold currents of air from high altitudes flow to the valley without interruption it

further north, where this range is practically unbroken and the Citrus belt is farther inland. These disadvantages of the northern section are, however, somewhat counteracted by the fact that the drier and warmer summer atmosphere is a greater guarantee against the spread and damages of insect pests. The more elevated inland localities in the south have this same advantage over localities nearer the coast.

From the best information obtainable some Oranges were planted in the Mission San Gabriel, Los Angeles County, in the year 1804. The nucleus of Orange culture in California was formed in this place and at about the above date by Padre, or Father, Sanches. The second trees were planted in Los Angeles by Don Louis Vignes in 1834. Several other small plantings followed about that date, but no orchards were planted with a view to selling the fruit till the coming of American people to California. The historic orchard of William Wolfskill, at Los Angeles, was the first planted with an idea of profit and he was the subject of ridicule when it was learned by his neighbors that he entertained this idea. When he died he had a bearing orchard of twenty-eight acres and that year the fruit was sold on the trees for \$25,000. A few trees were planted at Old San Bernardino by L. Van Leuven, in 1857, from seed grown



Fig. 62.—*Tsuga Araragi*.—See page 490.

1. A fruiting branch, natural size. 2. A cone-scale, with its seeds, natural size. 3. A leaf, natural size. 4. Portion of a branchlet, natural size.

would not be safe to attempt Citrus culture at any elevation within the sweep of these currents. On the other hand, wherever these descending currents are cut off or turned aside by spurs of the mountains, leaving the warm atmosphere of the day undisturbed during the night, there Orange and Lemon culture may be engaged in without danger from frost. In other words, the eddies of air currents must be selected and the main flow of these currents must be avoided.

Every one who has traveled along these Sierra foot-hills parallel with the valleys, particularly in the winter season and at night, will recall his surprise at the sudden changes in the temperature of the atmosphere within short distances. He may also remember to have noticed tender plants and shrubs seared and frost-bitten, although just over a ridge or cone the same plants or shrubs were in full leaf and growing luxuriantly. Want of attention to these facts has caused many disastrous failures in the cultivation of Citrus fruits in California.

It may be here observed that these peculiar natural phenomena are more striking and their lessons are more imperative north than south of the Tehachapi pass—for the reason that south of that point the coast range of mountains is broken up into fragments and the tempering influences of the waters and breezes of the ocean are more direct and powerful than

by him. He also planted the same year forty-five trees obtained from Los Angeles. About two hundred were planted at Crafton by Myron H. Crafts about 1865. The first seeds were planted at Riverside in 1870, and the first trees in orchard grown from these seeds, in 1872 and 1873. In 1869 Frank A. Kimball planted some Orange and Lemon trees at National City, San Diego County. At that time there were two old Orange-trees growing in El Cajon valley. In 1862 H. M. White planted two Orange-trees in Frazier Valley, east of Porterville, Tulare County. The first orchard was planted in Porterville in 1883 by A. R. Henry. About the same date a small planting was made at Centerville, Fresno County. Some time in the sixties the noted tree at Bidwell's Bar, on the Feather River, in Butte County, was planted. The seed from which this tree was grown was planted by Jesse Morrill in his garden in Sacramento. A few trees were planted in his garden by the agent of the Marysville and Oroville Railroad as early as 1868 at Oroville, Butte County. Thus we find that as early as 1870 small Orange groves had been planted all along the foot-hills from San Diego to Butte County. Plantings in many of the valley counties had also been made up to this date, but these latter have served to prove the inadaptability of the valleys to the growth of the industry,

while on the foot-hills the small beginnings have developed into one of the most permanent and profitable branches of horticulture in the state.

Although in early years the increase in planting, except in Los Angeles County, was quite slow, of late years it has been more rapid. In 1881, by official returns, the whole number of trees in the state was: Orange, 484,227, and Lemon, 62,130. Of these Los Angeles County had 450,125 of Orange and 48,350 of Lemon trees. Estimates of the number of Orange-trees now in the state vary between four millions and eight millions. There are of Lemon-trees one and a half millions. In 1879 Los Angeles County shipped fifteen cars of oranges out of the state. In 1890 there were shipped from the state 3,429 cars, mostly from three southern counties. By careful estimate California has this season to ship 12,000 cars of oranges and 1,500 cars of lemons. The receipts for oranges in 1890 to 1891 were \$1,796,025. This season, at the same prices, the state should receive for oranges \$6,300,000, and for lemons \$675,000, a total of \$6,975,000. The shipments this season will go from thirteen counties—San Diego, Riverside, San Bernardino, Santa Barbara, Ventura, Orange, Los Angeles, Tulare, Fresno, Sacramento, Placer, Butte and Tehama.

I have given the accepted estimate of this season's crop

it could not have been very sweet and ripe. But the trade seems to demand these early shipments, and prices have been steady at \$3.00 for best Navels, and \$2.00 for best seedlings.

An innovation in marketing fruit has been established at Redlands, the results of which will be watched by growers with great interest. This is an effort to give growers and packers an equal voice in establishing the prices of oranges from time to time through the selling season, and to eliminate, as far as possible, the element of competition among the packers of this locality. It is believed that this effort will result in higher prices to the growers. An association known as the Redlands Citrus Union has been organized, with a general committee consisting of one representative from each firm of packers, one from the patrons of each firm among the growers, and five members of the Redlands Horticultural Club, an organization which has as its objects the general horticultural interests of the city. This general committee will meet from time to time to fix the minimum price at which the oranges of this section shall be sold. The packers have agreed, in writing, to abide by the price so fixed. This is an extension of the principle of coöperation which has already aided in bringing the Redlands oranges reputation and high prices. The experiment is regarded with favor by all those interested, and



Fig. 63.—*Tsuga diversifolia*.—See page 490.

1. A fruiting branch, natural size.

2. A cone-scale, with its seeds, natural size.

3. A leaf, natural size.

4. Portion of a branchlet, natural size.

of oranges at 12,000 cars, but another reasonable estimate is 14,000 cars. If climatic conditions continue favorable the output will probably reach the latter figure. There will be a larger quantity of the best fruit than ever before, as the crop in those districts which produce the best will be largely increased. Riverside will have 4,000 cars instead of the 2,600 of last year; Redlands, 1,200 in place of 700; Ontario will increase seventy-five per cent, and the San Gabriel Valley expects double the crop of last year. The crop from the northern districts will probably not exceed 1,000 cars this year. But Tulare County is rapidly coming to the front as an Orange-growing section, and will soon be a noteworthy factor in the situation. It is interesting to note that this section and Redlands, both of which now grow fine oranges, were long considered unsuitable for Citrus culture: Tulare because it is so far north; Redlands because its northern slopes and heavy, red, clayey soil had not been tested. The two districts are at least 200 miles apart as the crow flies.

Early shipments have already gone forward from several localities; from Porterville and other places in the north; from Azusa, Covina and Highlands in the south, and shipping will be active from now on. The first carload was sent from Highlands October 23d. This is very early, and, although the fruit may have been well colored and pleasing in appearance,

will undoubtedly receive a careful trial. Other localities are investigating its merits with a view to its adoption.

Some of the facts stated in this article with respect to the history and the limits of the cultivation of Citrus fruits in California were collected while engaged in work with Mr. I. N. Hoag.

Redlands, Calif.

William M. Tisdale.

Foreign Correspondence.

London Letter.

BEGONIA GLOIRE DE LORRAINE.—At the risk of overdoing, I must again praise this beautiful plant. It has been a feature at every exhibition I have seen during the last two months; it has been and is the principal attraction in many gardens where warm-house plants are grown, and it is admired by all classes, even the Chrysanthemum worshippers stopping to praise it. Fogs do not appreciably hurt it, and it continues to flower all winter, its elegant flowers, colored bright rose-pink, being most decorative and useful in various ways. Scores of fine examples of it were shown at the last meeting of the Royal Horticultural Society.

BEGONIA MRS. HEAL.—This new hybrid, recently sent out by Messrs. Veitch, was shown in fine condition at this meeting, and plants a foot or so high showed fleshy dark green leaves six inches across and tall erect scapes with flowers two inches or more across and of the richest scarlet color. A second hybrid of the same parentage and origin was shown under the name of Julius. This is remarkable for its double, Carnation-like pale pink flowers, borne on nodding scapes and measuring nearly two inches across. It received an award of merit.

CARNATION WINTER SCARLET.—This useful addition to bright-colored winter-flowering Carnations was shown by Messrs. H. Low & Co., who have a large stock of it. It is superior to Winter Gem in its habit of flowering earlier, the latter being at its best in early spring, whereas this new variety is in perfection in November. It forms a compact plant eighteen inches high, with short, narrow foliage and numerous well-formed full flowers of a rich, glowing scarlet color.

ALBERTA MAGNA.—A bush of this handsome Rubiaceous plant from Natal is now an attraction in a warm greenhouse at Kew. I have before noticed this plant when it flowered in a pot in a cold house, but it is much superior now after having been grown in an intermediate temperature and planted out. The leaves are as large and glossy as those of the common Laurel, and the terminal-branched racemes of bright crimson tubular flowers are thrice as large and much more effective than those borne by pot-grown plants. Flowering in winter, too, the plant is all the more valuable. I anticipate for it considerable popularity when it becomes better known.

HYBRID ORCHIDS.—These were largely represented at the last meeting of the Royal Horticultural Society. Mr. Chamberlain sent Cattleyas and Lælias, among them a beautiful hybrid between *C. Dowiana* and *L. præstans*, in which the broad mauve-colored segments and the large open-cripsed labellum, colored maroon-crimson, with streaks of a darker shade and a few splashes of yellow, were peculiarly attractive. Messrs. Linden showed *Cypripedium Beekmani*, said to be a hybrid between *C. Boxalli* and *C. bellatulum*, but showing little of the character of the latter, although quite different from and vastly superior to any form of *C. Boxalli*. The flower is very large and richly colored. *C. insigne luciani*, from the same exhibitors, is a near approach to the greatly treasured *C. insigne Sanderæ*. Messrs. Veitch & Sons showed *Lælia Olivia*, a hybrid between *L. xanthina* and *L. crispa*, and fairly intermediate in form and colors. *Cattleya labiata*, White Queen, is the best white form of this *Cattleya* that I have seen. *Cypripedium Deedmanianum*, raised in the Birmingham Botanic Garden from *C. Chamberlaini* and *C. Spicerianum*, has a scape nine inches long, with a flower in which the dorsal sepal is not unlike that of the latter parent, while the rest of the flower resembles in form and color the remarkable *Chamberlaini*.

MUSHROOM CULTURE.—The demand for mushrooms at all times of the year is a great and increasing one. Their cultivation has, therefore, become an important industry in the neighborhood of large towns, and particularly of London, where there are now numerous large market-gardens in which Mushroom culture is practiced on an extensive scale. The outdoor ridge method and the indoor shed method are practiced, and while the latter is, perhaps, somewhat more costly, the mushrooms thus produced are cleaner and generally better in flavor than those grown on ridges. I have lately had an opportunity of inspecting one of the largest of these Mushroom farms, that of Mr. Tebbutt, in Isleworth, near Richmond, who kindly gave me particulars of his methods, which I think may be of interest to readers of GARDEN AND FOREST.

CULTIVATION IN THE OPEN AIR.—The ridges or raised beds are formed by arranging specially prepared horse-manure in mounds about a yard wide at the base and a yard high, narrowing it gradually from the base upward. These ridges may be any length to suit the convenience of the ground. The manure must be fresh horse-droppings and straw, and the better the food the horses have been fed

upon the better the results will be. Manure from the stables of corn-fed horses is much superior to that from stables where the food is chiefly grass or hay and otherwise poor. This manure is turned three or four times before it is made into ridges. It is well shaken, pressed with forks and trodden down firmly as the ridge is being formed. The sides are then combed with forks and beaten with spades or forks. When finished it looks like a long ridge of straw arranged to throw off the rain. The temperature of the ridge must now be watched, as inserting the spawn in too great a heat would mean inevitable failure. When the temperature of the manure an inch or so below the surface has fallen to about eighty degrees pieces of spawn-brick two inches long and wide are inserted about nine inches apart all over the surface of the ridge. Two or three days later the ridge is coated with about two inches of soil, which is put on wet and beaten with spades, a good clayey loam being preferable to any other, although ordinary garden soil will serve. The ridge is then covered with straw litter; the longest of that taken from the manure heap when it is being turned is generally used. In cold weather this covering may be twelve inches thick, but in mild weather less will do. The temperature on the surface of the soil should be maintained at about sixty degrees. In from six to eight weeks the first crop of mushrooms will be up, and if the ridge is well made a continuous supply will be yielded for from eight to twelve months. The estimated cost of these ridges, including labor, rent, etc., is about five shillings for each lineal yard, while the yield of mushrooms from a yard is from twelve to fifteen pounds, the average value of which is one shilling a pound.

CULTIVATION UNDER COVER.—The method of growing Mushrooms in large sheds or barns is as follows: The shed is divided into floors or shelves of wood four or five feet apart, with passages for convenience of working. Hot-water pipes are arranged for the purpose of keeping the requisite surface temperature in winter; the covering of litter is thus dispensed with. The manure is prepared in the same manner as for the ridges. It is then put on the floors or shelves, pressed down firmly, and when finished the layer of manure is from nine inches to a foot thick. The beds are spawned when the temperature is about eighty degrees, and a coating of wet clayey soil is placed over all and pressed down firmly with a wet board or the back of a spade. The mushrooms thus grown are perfectly free from litter or soil of any kind, and when placed in the punnets ready for market they are as white and smooth as eggs. Mr. Tebbutt grew two tons of mushrooms in an old barn last year, and he has this year built a shed about fifty by twenty-five feet, containing four layers of shelves or floors from which he expects four tons of mushrooms. During the winter and spring as much as two shillings a pound is not an unusual price for these first-grade mushrooms.

It is generally supposed that frost destroys the mycelium or spawn of the mushroom if allowed to get to these artificial beds, but Mr. Tebbutt has proved that frost does no harm beyond retarding the growth. Beds which had been frozen through in severe weather have yielded a good crop when brought on again by coatings and linings of fresh manure.

Many old disused buildings could be made to do good work by turning them into mushroom houses, and given good spawn, properly prepared stable-manure and intelligent management the production of mushrooms by the ton does not appear difficult of accomplishment.

London.

W. Watson.

We are accustomed to speak of urban parks as the lungs of cities, but the ideal park is more than a laboratory for purifying the air. It does more than offer an invitation to agreeable physical exercise and a change of mental occupation. Contact with and contemplation of natural scenery, especially of pastoral scenery, brings positive refreshment to the mind. Green pastures and still waters now, as in the days of the Hebrew poet, restore the soul. This is a fundamental truth, and, therefore, it has profound practical importance.—W. A. Stiles.

Cultural Department.

New Vegetables.

Gregory's Surprise Pea.—This is an American variety said to have resulted from cross-breeding the Earliest of All and the American Wonder. The vine and leaf resemble those of the first sort. The green and dry peas are much like those of American Wonder, while the pod is intermediate in character. I have had it under observation in a small way for three seasons, and with me the comparatively slender vine grows to the height of about two and a half feet, does not branch, and bears its pods singly, the lower one at the seventh to the ninth node. The earliest pods have become fit for use a little before those of the Earliest of All, but it has not furnished a picking any sooner nor has it matured all of its crop quite so early. With me the vine has not been quite so hardy, vigorous or productive as the Earliest of All, but the difference has been so slight as to be of no practical importance. The pods are a little shorter and more cylindrical than those of the Earliest of All and a little less in diameter than those of the American Wonder, and they are less attractive. The green peas are much the best in quality of any of the first early sorts, and superior in sweetness, tenderness and flavor to those of the Station, Eclipse or Gradus. They are better even than Alpha, and, of course, incomparably better than any of the smooth and hard sorts like Earliest of All and First and Best. When ripe they resemble those of the Alpha, being quite as small and wrinkled, but a little more square in shape and a trifle darker in color. I have not had an opportunity to see the variety under field cultivation, and it is hardly fair to judge of the purity and evenness of stock from the small quantities I have seen grown, which have been very good in these respects. It is reputed to come true and to show little tendency to sport. I question whether this will become a popular sort on the market because of its comparatively small and unattractive pods, but it will be welcomed by those whose judgment is not unduly influenced by appearances as a really good first early pea. As far as I can judge from my limited acquaintance with it this is the best first early for the home garden which has yet been produced.

The Gradus Pea.—This variety has been in cultivation in England for several years, but the quantity obtainable has been so small that the past season was the first that it has been extensively tried in this country. The vine grows to the height of from two to three and a half feet, is a little coarse-stemmed, with rather long nodes, and usually bears from four to six large, and two to three smaller pods, the lower one from about the eighth node. It rarely branches, even when given plenty of room, and has not proved with me very hardy or productive, but is better in both these respects than the Telephone was on its first introduction. I believe that stock grown for a few generations in this country will show even greater improvement in these respects than has developed in that variety. The pods first formed can be used about the same time as those of the Alaska or a good strain of Extra Early, but the crop does not mature so early or evenly, and will generally require several pickings to secure it. The individual pods remain in good condition much longer than those of most early sorts. The leaves are above medium size and the stipules are very large, so large as to distinguish the variety from all others, especially as they are a distinct light yellowish green color. The pods in size, shape and color closely resemble those of the Telephone, and are quite as handsome and attractive. They usually contain six to eight peas, and occasionally one is found having as many as ten. The green peas are very large, light bright green, oval in shape, and I think are sweeter and more tender than those of the Telephone. The dry peas are above medium size, coarsely and deeply wrinkled, and when well harvested and cured are a light green color, though if exposed to the sun in harvesting they bleach to a bright light yellow. Most of the stocks we have seen are much more pure and true than one can usually obtain of the newer English sorts, and with me the variety has shown little tendency to sport or run off in type. I am not certain what the future of this new Pea will be. Its earliness, the large size and beautiful appearance of the pod, and the excellent quality of the peas make it a most desirable sort for the market gardener, but its slow maturing, so that it requires a number of pickings to gather the crop, and its habit of growth, which calls for a liberal use of seed, are against it as a commercial variety. But these very qualities are in its favor for use in the home garden, and I think that it will find many friends among amateur gardeners and become extremely popular.

Golden Hubbard Squash.—This new squash has been before the public for two years and has proved to be a distinct and

fairly well-fixed variety of evident merit. The vine is vigorous and hardy, in general character like that of Hubbard, but on our rich soils it does not grow quite so rank, and in such cases instead of expending its surplus energy in the production of a few overgrown specimens it tends rather to develop a greater number of fruits of normal size. It matures some of its fruits quite early, nearly as early as the Prolific Marrow, and with me has always given a large crop, which has ripened before and much more uniformly than the Hubbard. The fruits are about the size and shape of a small and rather long Hubbard squash, the length coming from the projections at the stem and blossom ends being rather longer, and they are also generally more curved. It is very hard-shelled and uniformly warty, though the protuberances are smaller and less pronounced than in a warty Hubbard, and the projections at each end are smooth-skinned. When ripe the color is a rich orange-red, of a deeper and redder tint than that of Prolific Marrow, and about one and a half inches of the blossom end is dull olive-green, like a light-colored Hubbard. Some fruits show narrow, indistinct lighter stripes running from the blossom end, similar to those which the seed breeders have tried so hard to get rid of in the Hubbard. With me these fruits have proved as good or better keepers than those of the old sort. The flesh is a deep rich reddish orange color, darker than that of any winter squash I know, very fine-grained and brittle, and I have never seen one which was coarse-grained or had the objectionable green dots and shades found near the skin in most Hubbard squashes. The flesh is, however, only moderately thick, and the sort can probably be improved in this respect by selection. When cooked the flesh is very dry, often rather too much so, of fine color and grain, sweet and good-flavored, practically like that of the Hubbard, though if I were obliged to decide between the two on this point I should give the choice to the older sort.

Since the Hubbard squash was first introduced every few years there has appeared some new variety which it was claimed was better in some respects and just as good in all other particulars, and sure to displace the old sort. But after a few years' trial each of these has disappeared to be followed by another sort with the same history. To-day the majority of gardeners and consumers regard the Hubbard as by far the best winter squash, and I am not bold enough to say that it will ever give place to the Golden Hubbard or any other sort. It seems to me, however, that this new variety has some advantages over the old; it is more desirable in size and it is more uniform in this respect; it matures earlier and more uniformly; the exterior color is far more attractive than the dead green of the old sort; the flesh when cooked is of much better color and is practically the same in quality. It seems to me that the old stock may have to give way to an improved and beautiful descendant.

Detroit, Mich.

Will W. Tracy.

Amaryllis.

THOSE who saw the magnificent lot of seedling Amaryllis exhibited by Mr. Kenneth Findlayson, gardener for Dr. Weld, Brookline, which were shown in Horticultural Hall, Boston, last spring, will not soon forget it. These gorgeous bulbous plants have been imported at high prices from European raisers. There has been little thought of the possibilities of procuring stock at home. A beginning has been made in southern California, where the climate is favorable, to grow seedlings for the trade supply. The finest varieties, however, do not come in wholesale lots, and it is only by thorough and persistent effort that they are obtainable.

As the season for these remarkable flowers approaches, some account of the methods of seeding and raising them may be timely. To cultivators who can find the time required this will prove an interesting occupation. The flowers do not appear to be self-fertilizing. No seeds are produced unless the work is done artificially. The stamens are always ready before the pistils, whose tips reflex, becoming triclavate and gummy before they are ready to receive the pollen. But as the pollen will keep some time after it is ripe I always take the stamens off before crossing them with other pollen. To indicate how long pollen will keep fresh I was at North Easton one Friday, where the late Mr. William Robinson had some choice varieties in bloom; he kindly packed some stamens in tissue paper, which I put in my pocket, and forgot until the following Sunday. This pollen took well, and now I have a fine batch of seedlings which will flower this winter and spring from these crosses. When the pollen has taken the flowers drop and the capsules swell at once. It takes about six weeks for them to mature, and when ready they open longitudinally. As many as fifty seeds may be produced from a single capsule, and

these will be ready for sowing a few days afterward. I use pans of light soil, setting the seeds with the thin point downward. Light watering and a moderate temperature are sufficient, and the seedlings will be up in from four to five weeks. They may be pricked off in the ordinary way, and will make nice bulbs, though not large enough to flower the first season. Some growers have planted them out for the summer, though the most successful practice I have seen has been to keep them in pots; six-inch size will be large enough until they bloom. Mr. Findlayson's *Amaryllises* were kept indoors all the time, but this was principally to avoid the *Narcissus-fly* grub, which has been destructive lately. Until they flower they should be kept growing, but afterward they may be rested annually in the ordinary way.

Wellesley, Mass.

T. D. Hatfield.

More Orchid-flowering Cannas.

PANDORA is another of the Orchid-flowering Cannas from the list of Dammann & Co. We have the variety from the originators, and have been enjoying its blossoms in the greenhouse since September. The plant is dwarf, growing about three feet high. But these are young plants closely potted in the house, so that we may expect a larger growth of strong plants out-of-doors. The foliage is very dark red, splashed with lighter greenish red. The flowers most closely resemble those of *America*, described in *GARDEN AND FOREST*, vol. x., p. 178, with the attractive, full-rounded form of those of *Italia*, with reflexed petals (not staminodia). The petal-like staminodia are bright, fiery cherry-red, heavily splashed and overlaid with a darker velvety red, giving a peculiarly rich appearance. *Pandora* and *America* please us the best of all the Italian or Orchid-flowering sorts.

The varieties *Bavaria* and *Burgundia* (Dammann) have also been in blossom with us since September 13th. These are both of comparatively dwarf habit, the foliage being smaller and narrower than in the better-known *Italia*, *Austria* and *Burbank*. They both give blossoms of the *Italia* type, it being frequently difficult or entirely impossible to separate the three, *Bavaria*, *Burgundia* and *Italia*, by the blossoms alone. *Bavaria* tends to have more solid red at the centre, so that it becomes rather a yellow-bordered flower, of somewhat the same marking as *Queen Charlotte*; *Burgundia* is more spotted and looks a trifle more like *Florence Vaughan*; *Bavaria* usually has upright petals, while *Burgundia* commonly shows its *Canna flaccida* parentage in reflexed petals.

We had *Italia* and *Austria* in large beds on the open lawn throughout the summer, where they gave moderate satisfaction. Their large growth and heavy luxuriant leaves give a fresh, semitropical foliage effect worth consideration; but the blossoms are not, upon outdoor plants, an item of much importance.

University of Vermont.

F. A. Waugh.

Correspondence.

Ideals of Horticultural Instruction.

To the Editor of *GARDEN AND FOREST*:

Sir,—At a recent meeting of the Horticultural Seminar, to which reference was recently made in *GARDEN AND FOREST* (page 438), Professor F. A. Waugh, in the course of a paper on Ideals of Horticultural Instruction, said that in the fourth decade of this century Poiteau, an eminent French horticulturist, published what he considered an ideal course of study for horticultural students. It comprehended instruction in the elementary principles of those natural sciences having a technical application in horticulture, horticultural methods and an introduction to the literature of the subject. The end in view was the acquirement of technical skill.

Present notions of horticultural instruction in many schools are similar in ideals to those held by Poiteau. Obviously, related natural sciences, especially systematic and physiological botany, should precede a course in horticulture. With a course thus arranged, the instructor can pursue his ideal, that of technical instruction. But in some colleges horticulture is prematurely introduced before the prerequisites have been taken; hence more or less of the time that should be devoted to horticulture proper is necessarily spent in giving instruction that should have been previously given in other courses. This is a serious hindrance to the cause of horticultural instruction. In recent years, a few instructors, following Professor Bailey, of Cornell, have been influenced by quite different ideals. These men teach horticulture not merely for horticulture's sake, that is, for immediate practical results, but also, and this primarily, as a disciplinary

study in a scheme of liberal education. The former aspect of the subject belongs to technology, and can be taught to children in the industrial schools. The functions and purposes of a college course are different. Here the aim is to teach the student "to observe, to reason accurately, to present his thoughts cogently," and to cultivate the aesthetic tastes; in a word, the development of the mature man. In order to merit a place in a college curriculum, horticulture must confine itself within the scope of college instruction and must be subordinated to its aims. It must conform to the methods and requirements of liberal education in so far as the subject will permit.

Professor Waugh said there are three broad divisions of horticulture, each laid in a different field of knowledge: (1) a science, a branch of botanical science; (2) a philosophy, based on the science, and typified in the evolution course; (3) an art, illustrated in landscape-gardening. But art, science and philosophy are the basis of all university instruction. In such a course as is here advocated, while the student is adding to his general education, he is at the same time developing in sympathy with horticultural pursuits, and gaining an acquaintance with a valuable trade.

Those who follow Poiteau's ideal cultivate the practical side of the subject, in preference to the liberal aspect; their ideal is an institute of horticultural technology. The followers of Professor Bailey bring into the foreground the requirements of a liberal education; and while they teach technology, treat it as of secondary importance. Horticulture is a required study in agricultural colleges generally. For students who do not follow that occupation in after years, the technology is of comparatively little value; while the student who pursues a course shaped according to the second ideal develops in a manner to increase his satisfaction in life, whatever his surroundings may prove to be.

We may apply to horticultural instruction an epigrammatic statement made by President Fairchild, of Kansas, in his address at the Minneapolis meeting of the American Association of Agricultural Colleges, as to the development of agricultural education: "The ideal of agricultural education was first, education *for* agriculture; second, education *in* agriculture; third, education *by* agriculture." This characterization points out a real progress and the different stages of development are each marked.

In a short discussion that followed the reading of the above paper, Professor Waugh expressed his conviction that the greatest need in agricultural education to-day is that of High Schools that shall fit men simply for practical agriculture; and that the next step in agricultural education would be the establishment of such schools.

University of Vermont.

V. A. Clark.

Chrysanthemums in Boston.

To the Editor of *GARDEN AND FOREST*:

Sir,—At the recent exhibition of Chrysanthemums in Boston it was more than ever apparent that large flowers with strong stems were most popular. The florists' ideal was supreme; and the large vase of magnificent flowers of Mrs. Jerome Jones, shown by E. M. Wood & Co., was the centre of attraction. These were each of the same size, and arranged with such precision that the whole presented an even and rounded mass. That this was in keeping with the popular taste was evident from the frequent comments on other vases which did not show this regularity. There was one, however, in some respects a departure, arranged by Mr. John Ash, gardener for Mrs. Clark, of Pomfret, Connecticut, which the committee recognized by an award, though there were larger flowers in competing vases. While the arrangement of the blooms in all the other vases was uniformly even, and generally conceded to be effective, it was shown by the awards by the committee on plants that the matter of arrangement can be carried to excess. The groups arranged for effect were circular pyramids of single-flowered plants which followed, with one exception, the even plan of arrangement adopted in the vases. Kenneth Findlayson, gardener for Dr. Weld, of Brookline, effectively broke this monotony in his group by the use of a few separate plants, and was rewarded for his efforts.

Complaint is frequently made that naturally grown plants are not seen. The fact is that but few varieties are suitable for growing in this way. Plants like *Norma*, *Golden Ball* and many of the pompones stand up well, but the greater number would be accounted untidy if grown naturally. It seems to me there can be no halfway between a natural and a trained specimen. The greatest perfection in training is neatness and finish, just what we complain of when we want an artistic vase

of blooms. Those plants are adjudged best which are symmetrical in form and produce a mass of color. The decisions of the National Committee on Chrysanthemums judged by blooms alone, show that the deeply built incurved flowers which are well adapted for shipping, have been favored most, and even in the class for private growers few others have been recognized, though it may be that few have been offered. It will be seen, further, that when the grower of specimen plants must make his choice from blooms alone, and of this description, he finds few which are really suitable. If he is wise he will keep what is good among the older varieties, though he may be rated behind the times in consequence. Incurved varieties do not make as effective plants as reflexed ones; and when a large number of flowers have to be grown on a plant they are apt to be out of character. Sometimes the flowers are heavy, and the stems need to be supported close up to the flower. This gives a stiffness of arrangement which is far from effective. Experience shows that flowers belonging to the reflexed class, like President Hyde, Cullingfordii and W. H. Lincoln, make the best specimens and keep their character longest.

Wellesley, Mass.

T. D. Hatfield.

The Forest.

Willows at Chico Forestry Station.

THE Willows receive as yet little attention in California, and the value of our native species is not recognized as fully as it should be, although *Salix lasiandra*, which closely resembles *S. lucida*, *S. lasiolepis*, which somewhat resembles *S. humilis*, and the more distinct *S. laevigata*, all native in this state, are often planted for firewood and fencing. The best of the famous Spanish hand-made saddle-trees which were formerly produced in various parts of California and were even shipped to Mexico and Texas, were made of native willow wood, carefully selected and seasoned.

In time there will probably be an extensive demand for basket willows in California, especially for horticultural uses. *Salix viminalis* and other soft-wooded Osier Willows have been widely distributed for fifteen or twenty years by the Agricultural Department of the University, and have been planted in many places to protect levees and river banks. Aside from these Osiers, from *S. Babylonica*, and from the native Willows, nothing has been done with Willows in any part of California, although there is now more or less inquiry respecting the best species for cultivation.

The following brief notes upon various Willows planted at Chico Forestry Station were taken late in August of this year, when the season's growth, although not completed, was in most cases nearly so.

Our collection was begun in the spring of 1895 by planting in nursery small cuttings of twenty-four selected species received by mail. The soil is a good Corn land loam, near Chico Creek. Several native species of Willow are on similar soil, within a stone's throw. Again, in 1896 and in 1897, others were added to the collection, which now contains about forty species.

In February, 1896, from five to ten plants of each of the twenty-four species obtained in 1895 were set out in permanent plantation form. They received no irrigation, nor any especial care. The Willows in this plantation are, therefore, about thirty months old from small cuttings. The list includes *Salix alba*, *S. caprea*, *S. cordata*, *S. discolor*, *S. hippophæfolia*, *S. Japonica*, *S. Madeni*, *S. pentandra*, *S. purpurea*, *S. Salmoni*, *S. sericea*, *S. Sieboldii*, *S. Villarsiana*, *S. viminalis*, *S. daphnoides*, *S. dasyclades*, *S. regalis*, *S. lucida*, *S. serengeana*, *S. Babylonica*, *S. nigra*, *S. humilis*, *S. alba vitellina* and *S. caprea*, var. *cinerea*. Many of these Willows are beautiful in growth, and especially handsome in winter and spring. But since the collection was made in order to introduce the most useful species, I shall only describe those which seem particularly well adapted to California.

The Willow which shows the most remarkable growth is *Salix Salmoni*, a native of the Levant. This species in that

respect much surpasses all our native Willows as well as all others in the plantation. In the nursery the cuttings made roots and thrust up stems of ten feet in length within six months after planting. Five selected trees were cut back to one stem of two feet in height, and planted out in February, 1896. Now, in August, 1897, two of these trees stand respectively thirty-one and thirty-two feet in height, with trunks that exceed eighteen inches in girth at two feet from the ground. The other three are nearly as large. All five trees are beautiful in shape, with the straightest of main stems and with slender, semidrooping branchlets. Like *S. alba*, the young shoots seem to be well adapted for coarse basket-work if properly grown for that purpose, but the rapid development and hardness of this tree may give it greater economic value than Poplar or Eucalyptus globulus in some parts of California.

Salix alba and *S. alba vitellina* come next to *S. Salmoni* in point of growth, the former rising to a height of twelve feet, the latter to nineteen feet, with trunks which girth eight or nine inches. Although both these Willows are extensively used in Europe for timber, for charcoal, for hoops and basket-work, for tanning materials and other purposes, they do not as yet appear superior to some of our best native species.

Salix pentandra, though less rapid in growth, seems to be worth cultivation. The largest tree stands ten feet high, with a girth of five inches. The large, dark green, smooth and glossy leaves are extremely handsome. This species yields bark that is very rich in salicin, a substitute for quinine and a useful anti-rheumatic.

Salix caprea, another handsome species, grows very rapidly here. The tallest trees are fourteen feet high, with trunks eight inches in girth. The bark is valuable for certain sorts of tanning and the timber is very useful.

The average rates of growth of some leading species, as compared with *Salix Salmoni*, have been as follows; age, soil, culture and other conditions were the same in all cases:

	Feet.		Feet.
<i>S. Salmoni</i> ,	30	<i>S. Sieboldii</i> ,	10
<i>S. alba vitellina</i> ,	18	<i>S. Madeni</i> ,	8
<i>S. regalis</i> ,	15	<i>S. cordata</i> ,	6
<i>S. caprea</i> ,	14	<i>S. viminalis</i> (female plant),	5
<i>S. daphnoides</i> ,	13	<i>S. lucida</i> ,	4
<i>S. viminalis</i> (male plant),	12	<i>S. purpurea</i> ,	4
<i>S. pentandra</i> ,	10	<i>S. discolor</i> ,	3

The best native Willows under similar conditions appear to rank in point of growth somewhere between *Salix Sieboldii* and *S. regalis*.

Niles, Calif.

Charles H. Shinn.

Recent Publications.

Stories of Insect-Life. By Clarence Moores Weed. Ginn & Company, publishers, Boston and London. 1897.

This little book, of fifty-four pages, bears no introduction or dedication, but is evidently intended for children or those taking their first steps in entomology. It is, in fact, a number of first lessons or a primer which would naturally precede the same author's more elaborate *Life Histories of American Insects*, recently noticed in these pages. The short chapters particularly deal with only a dozen of our most common insects, although their attendant parasites are also noticed. Naturally and properly the first chapter is on "The Tent Caterpillars and their Nests," something that children are most likely to observe and inquire about, and the following chapters tell of "The Moth and its Eggs" and "The Tent Caterpillar Parasite."

The descriptions for the most part are simple and apparently freed as much as possible from technical terms, although there are some points which need to be made clear to the young mind. As there are various species of various genera of tent-building caterpillars it might have been better if the name of *Clisiocampa* had been given in connection with the species under discussion. It would certainly be no more difficult to master than the word *ichneumon* which is used, and in the child's mind tent-

caterpillar might mean the Fall Web-Worm, an insect of very different habits and appearance. Other popular subjects arranged for the juvenile mind are on the Common Potato Beetle, the May Beetles or June Bugs, and Cabbage-worms. It is a question whether the Ant-lion, the Lace-wing Fly, or the work of the larva of a Syrphus fly among plant lice are sufficiently well-known subjects to treat in a book or booklet of this kind, when so many more conspicuous or cosmopolitan species are available. The history of the Dobson, although interesting, is a subject likely to be practically understood by a select few who have opportunities for observation in particular localities. In this class is most likely to be the fisherman or boy who frequents the shores of some rocky brook or river; and he may wonder why the adult Dobson should be called a "Hellgramite," a name quite as heavy for the young mind to carry as *Clisiocampa* for the tent-caterpillar.

Each chapter, however, cannot fail to interest every true observer of animate nature who may be taking first lessons in the wide field which opens before those who enter the domain of Entomology. The pages are well illustrated by numerous original or borrowed figures and the typography is large and clear.

Notes.

The venerable Box-trees in the Bartram Garden, in west Philadelphia, which are probably 150 years old, and now about twenty-five feet high, are still in perfect health and beauty, and show the permanency of this European and Asiatic tree in the Atlantic states, where of late years, at any rate, it has been too generally overlooked by gardeners. Every one knows the value of the dwarf Box for the edgings of garden beds, but it seems less generally known that all of the numerous arborescent forms of *Buxus sempervirens* are hardy, even in New England. There is something very homelike in the Box and its pleasant odor, even to Americans, who generally know it only in old gardens or in foreign lands, and there is no plant which we can use here safely which is such a cheerful winter inmate of northern gardens; and no other broad-leaved evergreen we can plant grows equally well in the shade of other trees and in the full light of the sun. Most beautiful when it is allowed to grow naturally into a rather open-branched small bushy tree, the Box is also well suited for formal gardening and bears wonderfully well an annual shortening of the branches, which changes the open-headed tree into a dense ball or pyramid which, once formed, can be kept indefinitely in shape.

The berries of *Cissus Ampelopsis* of the middle and southern states are most remarkable as well as beautiful in color, clear pink, purple, rich blue, and an almost emerald green occurring in the same cluster. The botanists describe them as bluish, bluish or greenish, etc. They much resemble those of the Chinese species, often cultivated in this country for its beautifully colored fruit, and are not less beautiful, but while in the latter the prevailing color is a rich Nile blue verging to emerald green, purple and pink shades, especially the latter being exceptional, the reverse is true with the American species, in which a delicate lilac-pink is the predominating hue. Like the blue berries of *Cornus circinata*, the berries of this vine, which in the forest completely covers large trees with a luxuriant drapery of foliage, are a favorite fruit of many kinds of birds, particularly the catbird, brown thrasher, wood thrush and flicker, and on this account, if no other, should be grown by all lovers of birds. The fruit of *Cissus* stans, another southern species, is also very distinct in its coloring, the extremely glossy berries, the size of peas, ranging from light pink, through garnet, red and dark crimson to jet black. The elegant pinnate foliage of this vine is unique in its peculiar dark bluish-green color, the upper surface of the leaves having a semimetallic lustre.

In this winter month vegetables are still shown in great variety not only in the principal markets, but as part of the regular stock in many of the food-supply stores in residence sections of the city. Besides summer crops grown in the north, as Irish potatoes, sweet potatoes, cabbage, celery, onions, pumpkins, Hubbard squash, carrots, parsnips, beets, salsify, celeriac, Jerusalem artichokes, Brussels sprouts, cauliflower and turnips, fresh products from hothouses and southern

fields are common. Small carrots in bunches, with fresh tops, are one of the most attractive and showy of the new vegetables; these are grown in frames near by; choice mushrooms now sell at sixty-five cents a pound; radishes, from northern hot-houses, and cucumbers, from Boston, are seen in every collection; the latter cost fifteen cents each. Cucumbers grown out-of-doors in Florida cost half this price. Scalloped squashes, or cymplings, from Florida, at seven cents each; string-beans, at twenty cents a quart; peas, at \$1.00 a half-peck, and tomatoes, at twenty cents a pound, are other receipts from the same state. Eggplants, peppers and okra are in regular supply. New beets, from New Orleans, cost seven cents a bunch, and new potatoes, from Bermuda, bring fifty cents a half-peck. Artichokes, from France, sell at twenty-five cents each. Kale, lettuce, spinach, escarole, dandelion, cress, chervil, parsley, corn salad, mint, chives and tarragon are all seen at Kelly's, in Washington Market, many of the more delicate and tender greens coming in neat bunches in small hand-baskets direct from growers in New Jersey and Long Island.

In the November issue of *The Botanical Magazine*, Sir Joseph Hooker figures and describes *Mammea Americana* (t. 7562), a West Indian tree cultivated for its edible fruit, the mammee apple, which occasionally finds its way into the fruit-stores of this city. The fruit, which Sir Joseph Hooker has eaten on the Cape de Verde Islands, where this tree was early introduced, he compares to a good turnip with a sweetish and faintly aromatic flavor. The *Mammea Americana* is a large umbrageous tree from sixty to seventy feet in height, with a stout trunk and a dense head of thick branches covered with dark brown bark. The handsome white flowers are produced singly or in from two to four flowered clusters directly from the wood of the branches in the axils of fallen leaves, and are fragrant and about an inch and a half in diameter. The fruit, which varies from that of the size of an orange to that of a child's head, is hemispherical or nearly so, with a rough, leathery yellow bitter rind and a thinner interior skin enclosing a firm, somewhat spongy white pulp soon turning yellowish and of a hard fibrous consistency. This pulp surrounds from one to four large brown oblong, rather compressed rugose nuts with hard fibrous coats and oily, fleshy cotyledons. By the Portuguese and early British residents in the West Indies the fruit was cut in pieces and eaten with wine and sugar, and also preserved. A liquor called Eau de Creole and Crème des Creoles is obtained by distillation from the flowers infused in spirits of wine. From the bark an acrid resinous gum is obtained and the cotyledons yield hair oil. The wood is described as being comparatively worthless, but the tree with its brilliant green leaves and deliciously scented flowers is so handsome an object that Tussac, in his *Flora of the Antilles*, where it is well figured, speaks of it as "*La Sirène Végétale*."

The following note by Mr. W. L. Jepson, published in the November issue of *Erythea*, will interest, perhaps, those who have been successful in cultivating *Carpenteria Californica*, one of the most beautiful flowering shrubs of the Pacific states. "The first collector of this plant, as is well known, was General Fremont, who obtained it on one of his expeditions through the interior of California. No definite locality was known for *Carpenteria* until Dr. Gustav Eisen rediscovered it in Fresno County, on Big Dry Creek, in the foot-hills north-east of Fresno City. The shrubs, of which there were probably about 1,000, grew on the southern exposure of a chaparral hill about a mile above the toll-house, near what is known as the Grape Vine Spring, on the road to Pine Ridge. The altitude is about 3,500 feet, where are found the last Digger Pines (*Pinus Sabiniana*) and the first Sugar Pines (*Pinus Lambertiana*); it is also the lower limit of *Fremontia*, which extends 500 feet higher up. The shrubs were about seven to eight feet in height, and the flowers very striking in their showiness. The particular hill on which the species was found was about a mile in circumference. Big Dry Creek does not empty into Kings River, but loses itself in the San Joaquin Plains. Dr. Eisen collected about twenty-five pounds of the fruit, which was sent to a Washington florist, who distributed seed to other florists of the eastern United States and Europe. From such a source came the plants that were offered for sale in their catalogues. From seed of the same collection a single plant was also grown in the experimental garden of the Department of Agriculture of the University of California. This bush has never fruited, but it has been easily propagated by cuttings. The above account of the single known locality was drawn up from a verbal description by Dr. Eisen. The rediscovery of the species was made in 1875 and the locality was revisited during several years thereafter."

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Landscape-gardening.

PUBLIC attention has recently been directed in this city to several enterprises seriously affecting the future of the public parks. Among them are the creation of the Botanical Garden, the transference of the Zoölogical collection from Central Park to one of the newer pleasure-grounds, the proposed erection of the Soldiers' and Sailors' Memorial, and the alteration of the entrance to Central Park at Eighth Avenue and Fifty-ninth Street. In none of these cases has the best course been pursued to secure the best result. Either the advice of experts has not been asked or it has been asked and not respected.

The fact that in so many instances, happening within a short space of time, mistaken efforts have been combatted, but without full success, proves that we are awakening to the truth that expert knowledge is required for the protection of our parks, but that we do not yet really appreciate either its nature or its value. And this means that we do not yet appreciate the individuality and the importance of the art of landscape-gardening.

More interest is felt in this art, both by the public and by artists in other branches, than was felt a few years ago. Yet the old idea that any person, ignorant of art but possessing a "feeling for nature," is competent to decide any question with regard to a naturalistic pleasure-ground has not yet died out. And, on the other hand, those who are expert in artistic questions of some different kind do not yet understand that, nevertheless, they may be incompetent to deal with problems of naturalistic landscape-gardening.

This branch of the art of gardening is of much more importance to the American people than the branch which concerns itself with the creation of formal pleasure-grounds. Of course, the borders of the two branches overlap; but naturalistic ideals are those which, in the great majority of cases, can best serve the needs of American communities. Only in the narrow environment of city buildings, and in the immediate vicinity of large and stately edifices which stand in more open situations, are formal gardening schemes demanded in this land and age. Vast formal pleasure-grounds, such as were created around the palaces of the Old World for the delectation of the frequenters of luxurious courts, are inappropriate to the needs of modern

times; and this is especially true in our democratic country. Our parks, large and small, exist for the greatest good of the greatest number; and this good can best be secured by making them, within the bounds laid down by art, as much like Nature's landscapes as possible. Only in this way can they fulfill the need of the populace for rest and refreshment, and bring Nature's peaceful, soothing, inspiring influences to bear upon the minds and bodies of those who live and toil amid the noise and stress of modern civic conditions; and only thus can they be genuine and characteristic works of American art, expressing the ideals and the temper of American civilization. The question of relative beauty need not be discussed. It need not be inquired which is more beautiful in itself, a great formal rich man's pleasure-ground like the royal park at Versailles or a great popular pleasure-ground like Prospect Park in Brooklyn, for it is certain that a popular pleasure-ground is the one which American tastes and practical needs require.

Probably no one will deny these assertions. The disputes which constantly arise in respect to our parks spring merely from disagreements in regard to what bounds art lays down for their treatment. But here the divergence is wide. The average citizen seems to think that, as a public park is for the public good, anything and everything which any section of the public desires ought to be provided within its borders. The average "lover of Nature" believes that Nature herself has set the bounds and prescribed the scheme for its beauty; that the artist should blindly respect everything she has created on the given site or, introducing needful work of his own, should make it, as deceptively natural-looking as possible; and that, once his park is ready for use, Nature alone should care for its vegetation; and the average architect believes that a naturalistic park is a concession to the taste, or lack of taste, of our inartistic time; that it should, therefore, be made as little naturalistic as possible; that it should contain as many formal passages and ornamental structures as can be compassed, and that these should be considered of primary importance.

But widely apart as these extremists stand, their misconceptions are based upon the same error. Neither of them perceives that naturalistic gardening is in itself a true and noble art, an independent art, with special ideals and laws and boundary lines which cannot be well understood except by those who have given them special and sympathetic study.

In these pages an effort has more than once been made to explain, as well as brief words could do it, the aims and expedients of this branch of gardening-art, which was born, at the close of the Renaissance period, with the birth of modern civilization, and has perhaps received its fullest and finest expression in this country. Such an effort cannot be repeated now. To-day we merely wish once more to call attention to the dignity, the individuality and the essentially American-character of the art of landscape-gardening, and to warn our people once more not to allow themselves to forget the need of experts to guard as well as to create their parks, and not to mistake the meaning of the word expert. A man is not necessarily an expert in park matters if he accepts the office of park commissioner, or if he is a practiced botanist or horticulturist or engineer, or if he is a passionate lover of Nature, or if he has taste and experience in artistic works of other kinds. He is an expert in park matters only if, with inborn artistic taste and an understanding of the needs of our people to help him, he has thoroughly studied landscape-gardening itself and its application to American conditions. The engineer may have a portion of the needful wisdom, and so may the architect, the botanist, the horticulturist, and the business man familiar with large financial undertakings. But not either one of them nor all of them together can have the power to design a naturalistic pleasure-ground well or to maintain it properly.

Different dangers have threatened American parks at different times; just now in this city, at least, they seem to be specially threatened by the danger that the architect

will confidently assert his ability to design and to conserve them, and that the public will endorse his claim, believing him to be an expert. In one sense his art stands closer to that of the landscape-gardener than any other. Both concern themselves with the production, not of merely ornamental objects, but of objects of practical utility destined for actual occupation or frequentation by human beings; and the work of laying out formal gardens has a close æsthetic as well as practical affinity with architectural work. But here the parallel ends. Naturalistic gardening has very little æsthetic affinity with architecture. Symmetry and definite balance, mathematically exact proportioning, unity achieved by the repetition of conspicuous forms and features, and harmony achieved by the reiteration of subordinate ornamental motives—these are merits so characteristic of the art of architecture that, whenever we see them achieved in other arts, we say that the result has an architectural kind of beauty. But they are not the merits for which the landscape-gardener strives. He strives, indeed, for unity and harmony, for balance of parts and for appropriateness in the use of ornamental details; but he achieves them by avoiding symmetry and obvious repetitions, by appearing to treat each passage in his work for the sake of its individual importance and yet by combining them in subtle ways, often inexplicable in words, into a coherent artistic whole. The student of Oriental art will get a glimpse of his ideals when we recall the fact that the Chinese were the earliest landscape-gardeners, and say that, as modern architecture—with its helper, formal gardening—has come down to us in a straight line from classic art, so landscape-gardening has come down to us in a straight line from early Oriental art. It is not now in America the same art that it was in ancient China, any more than our buildings are the same as those which the Egyptians, Greeks and Romans knew. But the general ideal has been preserved in the one case as in the other. The radical difference between the ideals of the architect and of the landscape-gardener therefore lies in the fact that the one secures unity, harmony and beauty by the use of symmetry, the other by its avoidance.

This is the great reason why the modern architect, unless he has also made a special and sympathetic study of landscape-gardening, should not pose as an expert in park matters. The better architect he is, the less likely he is to understand the aims of an art so radically unlike his own in its ideals, or even to confess that it is as true and worthy an art as his own. Other things being equal, a landscape-painter is much more likely to understand the beauty and therefore to realize the needs of a naturalistic park than an architect. He knows that a natural landscape is not always beautiful, but often needs to be "arranged" before it can be turned into a picture; and he knows that this may be done without injury to its naturalistic character. He understands how composition—meaning a beautiful harmonious arrangement of lines and colors, of masses and voids, of lights and shadows—may be achieved without symmetry; he knows how balance may be secured without an obvious opposition of equal parts, how details may be made truly ornamental without reiteration, and how all this may be done in accordance with binding artistic laws and yet the general result seem spontaneous and natural.

Of course, on the other hand, the landscape-painter cannot be expected to understand those practical problems which, in the making of large parks, are of equal importance with æsthetic problems. He is not an engineer, he is not a horticulturist, and he is not experienced in regard to the needs and habits of masses of people seeking refreshment in the open air. Thus we come back to our main proposition: No one is experienced in all these matters except the man who has studied the making of naturalistic parks in and for itself. There are not many such men in our country. There are some, however, and they alone have the right to be regarded as experts. And until the public on the one hand and the artistic professions on the

other recognize this fact and act in accordance with it, our parks will never for a day be really safe from educated or ignorant vandalism.

Notes on Cultivated Conifers.—XII.

CEDRUS, which is confined to the Atlas Mountains of Algeria, the Island of Cyprus, the Lebanon, the Cilician Taurus, and to the mountains of northern India and southern Thibet, is a well-marked genus of three species, with scattered primary and tufted secondary persistent leaves, solitary staminate flowers on the ends of short spur-like branches, and erect cones with thin, entire, rounded, persistent scales. The type of the genus, *Cedrus Libani*, is one of the most magnificent of all cultivated conifers in those regions like some parts of England and France, where it really flourishes. The Cedar of Lebanon is not hardy, however, in Massachusetts; it barely survives in the neighborhood of New York, although a few years ago there was a fairly good specimen on the grounds of the old Prince Nursery, on Long Island; it is more successful further south and there are a number of healthy plants near Philadelphia and Washington. On the whole, the Cedar of Lebanon must be considered a failure in eastern North America. All the cultivated plants, however, are derived from seeds raised in Europe on trees taken from the original Lebanon stock, and it is quite possible that if plants were raised from seeds obtained from the high Cilician Taurus, a more northern and a colder region than the Lebanon, they would prove as hardy here as the Cilician Fir, another conifer of the same region. This would be an interesting and useful experiment to make, but, unfortunately, it appears practically impossible to find any one in the central part of Asia Minor to gather the seeds. The Algerian Cedar (*Cedrus Atlantica*) is rather more hardy than its near relative of the Lebanon, and small plants of the beautiful blue-leaved form of this tree have lived for the last two or three years in Mr. Hunnewell's pinetum. It is more vigorous, however, further south, and the best plants of this form which I have seen in the eastern states are at Biltmore, North Carolina. The Himalayan Cedar (*Cedrus Deodara*) has not proved a successful tree in Europe, where it has been planted in large numbers; it is not at all hardy here at the north, but I have seen healthy plants in Georgia and other southern states, and in California.

Larix, the Larch, is closely related to *Cedrus*, but the leaves are deciduous; the male flowers are borne on lateral branches of the previous year, and the much smaller cones with scales shorter than the bracts in some species, are at first nearly horizontal, and then assurgent. The genus, which is widely distributed over the boreal and elevated regions of the two hemispheres, is composed of about seven species, which are generally large trees and produce strong, durable and very valuable timber.

The Larch which has been most planted in the eastern states is *Larix Larix*, the Larch-tree of the mountains of central Europe, where it sometimes grows in extensive forests, and frequently forms the timber-line either alone or with the Spruce and Stone Pine. This Larch has been largely planted in Europe for timber, especially in Scotland, and successful experiments have been made with it as a timber-tree in New England. It is very hardy here and grows rapidly even in dry gravels, but, like the native species, it is now frequently disfigured by insects which kill the leaves during the early summer and weaken the trees, although they usually cover themselves with a second crop of leaves. In very early spring the Larch is lovely with the tender green of its young foliage, but later in the season the leaves often have a rusty look, due perhaps to the heat and dryness of our summers; and this Larch, which seems to belong only on rough mountain sides, appears, with its small regular branches and straight pyramidal habit, out of harmony with round-headed trees and out of place in pastoral landscapes. There is a form of *Larix Larix* with distinctly pendulous branches (var. *pendula*) of Swiss origin,

and now common in cultivation, which is curious rather than handsome; and Beissner describes other abnormal forms which I have not, however, seen. The Siberian Larch (var. *Sibirica*) is now generally considered a geographical form of the European species. It forms great forests on the plains of Russia and Siberia, and grows also on the Ural and Altai Mountains. This tree, so far as I know, has not been sufficiently tested in the United States.

Much more picturesque than the European species is our native *Larix laricina*. This inhabitant of northern swamps grows to a large size when transplanted into dry ground, and sends out long and often contorted branches. It is this tree which may often be seen in great beauty standing near old New England farmhouses and country mansions, and as an ornamental tree the eastern American Larch, which has been neglected in recent years, may well be used much more freely than it has been.

In *Larix occidentalis* of the high interior Columbian basin of the north-west *Larix* displays its greatest size and nobility of port, and furnishes to the world one of its great trees. From 150 to 200 feet in height, with a tall massive trunk from seven to ten feet in diameter and covered with bright cinnamon-red bark broken into thick enormous plates, the western Larch is one of the most beautiful and impressive trees of the continent, and in strength of timber surpasses all other American conifers.

Long neglected by the cultivators of exotic trees because David Douglas, who introduced most of the trees of the north-western part of this continent into English gardens, mistook it for the eastern species, *Larix occidentalis* was first cultivated in 1880 in the Arnold Arboretum, whence it has been distributed among many of the principal tree-lovers of the United States and Europe. Seedling plants of this Larch grow badly here and still remain small and stunted, but grafted on the roots of the Japanese species it has grown rapidly and vigorously, and the largest plants, now about eighteen feet in height, have already produced a few cones. The second species of western North America, *Larix lyallii*, is a small alpine tree found only at the timberline on some of the high mountains of southern Alberta and the adjacent parts of the United States. It has not been introduced into cultivation, and probably would grow very slowly at the sea-level. Even in its best condition, this Larch has little to recommend it to the lovers of ornamental trees.

The Japanese Larch (*Larix leptolepis*) is common at elevations of from 5,000 to 6,000 feet above the sea, scattered always in small groves mixed with other deciduous trees, and is confined to the central part of the main island. It is a handsome tree, seventy or eighty feet tall, with pale blue-green foliage and a massive trunk covered with reddish bark, and in habit is not unlike the European species. *Larix leptolepis* is perfectly hardy in eastern Massachusetts, and the large specimen which stood for nearly thirty years in Mr. Hunnewell's pinetum produced annually abundant crops of fertile seeds. Although it grows here very rapidly, the Japanese Larch is certainly inferior as an ornamental tree to the native species, and it probably will never become popular in this country. There is an alpine form of this tree (var. *Murrayana* of Maximowicz—*Larix Japonica*, Murray) which grows on Fugi-san at an elevation of about 8,500 feet, and differs from the common form only in its dwarfer habit, shorter branches and smaller cones. This plant has been raised in the Arnold Arboretum from seeds which I brought from Japan five years ago. It is, of course, too soon to form any idea of its value here. And this is true of *Larix Dahurica*, which is a large tree not unlike the European Larch, and possibly only a geographical form of that species, which is widely distributed through Siberia, northern China, Manchuria, Kamtschatka and Saghalin. Young plants of this Larch are growing well in the Arboretum, where they give promise of success, as do seedlings of the form of this species which reaches the extreme northern part of Yezo and the Kurile Islands (var. *Japonica*

of Maximowicz—*Larix Kurilensis* of Mayr) (see GARDEN AND FOREST, vol. vi., fig. 76).

The Himalayan *Larix Griffithii* has been raised several times in the Arboretum, but the seedlings have soon died, and I have never seen anywhere a good plant of this Larch, which in its native mountain forests of Nepal, Sikkim and Bootan is a slender tree sixty or seventy feet in height with long thin pendulous branches and elongated cones larger than those produced by any other Larch-tree, and conspicuous for their long exserted bracts.

Pseudolarix, like Ginkgo, is a monotypic Chinese genus known only from trees cultivated in temple gardens. It resembles *Larix* in its clustered deciduous leaves, but differs from that genus in its stalked, elongated, pendulous male flowers, borne in umbels at the ends of short spur-like lateral branchlets, and in its deciduous cone-scales, which separate from the central axis as soon as the cone ripens. Little is really known yet of this interesting tree either in Europe or America. Fortune, who first saw it dwarfed in Chinese gardens, finally, in 1854, discovered some trees near a Buddhist monastery in Che-kiang, which he estimated to be from 120 to 130 feet in height with trunks five feet in diameter, and sent the seeds to England. If it is cultivated at all in Japan I failed to notice it there, and Rein in his exhaustive work on that empire does not mention *Pseudolarix*, so that this tree is known outside of China only from specimens less than fifty years old. The largest tree I have seen is in the Rovelli Nursery at Pallanza, Italy, and is now probably nearly forty feet high; on the grounds of the old Parsons Nursery in Flushing, Long Island, there is a plant nearly as large, and in Mr. Hunnewell's pinetum there is one that has produced fertile seeds for several years. *Pseudolarix Kämpferi*, as the species is called, appears to delight in hot dry summers, and will probably succeed in our northern states better than in western Europe. I have never seen a plant which appeared to suffer from heat or cold, fungal diseases or the attacks of insects. The Golden Larch, so named probably because the leaves turn bright clear yellow in the autumn before falling, is one of the most promising of the exotic trees which are on trial in this country, and now that plants in Europe and America are beginning to produce seeds, it will soon be possible to test it here more thoroughly than it has been in the past. The young trees have more the habit of *Cedrus* than of *Larix*, with long branches usually pendant at the extremities, and generally a broad flat-topped rather than a pyramidal head.

Pseudotsuga, a barbarous and entirely inappropriate name, half Greek and half Japanese, has been inflicted on one of the most beautiful and valuable of all American conifers, the great Douglas Spruce of western North America. The genus is pretty closely related to *Abies*, from which it differs, however, in its petioled leaves, pendulous cones with persistent scales always much shorter than their conspicuous three-lobed bracts, and in the structure of the seeds, which are destitute of resin vesicles. There are two species in western North America, and in Japan, judging from the figure of a cone recently published in a Japanese botanical periodical, there is evidently a third about which, however, nothing as yet appears to be known to the outside world.

The Douglas Spruce, *Pseudotsuga taxifolia*, is one of the largest and most widely distributed trees of the continent. Near the shores of Puget Sound, where it grows in the greatest perfection, individuals between three and four hundred feet in height, with trunks ten feet in diameter, are not rare, and trunks even larger can occasionally be found. Trees nearly as large grow on the western slope of the California Sierra, but in drier interior regions where the Douglas Spruce is found on nearly all mountain ranges southward to Mexico and eastward to Wyoming, the outer range of the Rocky Mountains in Colorado and to the mountains of western Texas, it is a smaller tree, usually not more than 100 feet in height, with a trunk only four or five feet in diameter. The Douglas Spruce was introduced into English gardens nearly seventy years ago by David Douglas, and its value as an ornamental tree in

western Europe is shown by the existence there of specimens already more than 100 feet high, with long lower branches sweeping the ground. The first attempt to cultivate this tree in the eastern states with plants, doubtless of Oregon or California origin, imported from England, were not successful, as they were generally unable to adapt themselves to our dry, hot summers. But in 1861 Dr. C. C. Parry found the Douglas Spruce in Colorado, and from the seeds which he sent to the Harvard Botanic Garden plants were raised which have proved perfectly hardy here. The largest of these are now more than twenty-five feet high, densely clothed to the ground with vigorous branches, and perfect in color and density of foliage.

This demonstration of a fact that plants of the same species, raised from seeds gathered in different parts of a wide territory with different climatic conditions, is interesting, as it indicates that it may be possible to cultivate other trees here which have heretofore been considered tender, if specially selected seeds are used. In the case of the Douglas Spruce several American nurserymen have not been slow to take the hint, and during the last ten or fifteen years great numbers of the Colorado form have been planted in New England, where the plants are growing rapidly into handsome, healthy trees, promising, if it is safe to judge by the appearance of this tree in its native forests and in Europe, to surpass here in permanence and mature beauty the other conifers of western America.

The second American species of *Pseudotsuga* (*P. macrocarpa*) is a small tree found only on the arid mountains of southern California, which has never been tested here and could never support the cold of a northern winter.

The next and final number of these notes will be devoted to *Abies*, the only remaining genus of *Coniferæ* which furnishes hardy plants to our northern gardens.

C. S. S.

Lilium parvum and *L. parviflorum*.

IN his *Synopsis of all the known Lilies*, published in 1875, which is still the best authority for the nomenclature of this noble genus, Mr. Baker treats *Lilium parvum*, *L. Walteri* and *L. parviflorum* as varieties of *L. Canadense*. In the *Botany of California*, published in 1880, Dr. Watson follows Dr. Kellogg, who first described *L. parvum*, considering it a distinct species, and accurately describes Kellogg's typical form, but assigns to it a far more extensive range than it really possesses. Dr. Watson quite overlooked the other forms. At a still later date some English authority gave the name of *L. pardalinum*, var. *minor*, to one of the forms of *L. parviflorum*, which is now quite generally known in European gardens under that name.

I believe that a much more natural grouping would be to confine the name *Lilium parvum* to Kellogg's typical form, and to include all of those forms with more or less reflexed or revolute flowers under *L. parviflorum*. Following this division, therefore, I will proceed to speak of the typical *L. parvum* of Dr. Kellogg, the *L. Canadense*, var. *parvum*, of Baker.

Lilium parvum is a lily of high and subalpine regions in the central portion of the California Sierras. So much of the Sierra Nevada is unexplored by botanists that it is hard to set close bounds to the range of a species, but I have good evidence that the species does not extend to Plumas County on the north or farther than the Yosemite Valley on the south. It is found at an altitude of from six to nine thousand feet, and is common along the snow-fed streams which flow into the Truckee and Lake Tahoe on the east, and into the Yuba and American rivers on the west, as well as about the edges of the Tamarack swamps of that elevated region. It is not infrequent at an altitude where the snow lingers until July and August, and is again seen in September or October.

Lilium parvum is a charming little lily, well worthy of general cultivation. The soil in the localities where it is found is a granite sand rich in vegetable matter and the drainage

is good. It can hardly be called a Bog Lily. The stems are slender and leafy, and both stems and leaves are light green. The leaves are from long ovate to broadly lanceolate. There are a few whorls, but many leaves are scattering. The flowers are horizontal or ascending, funnel-formed, with only the tips spreading and a brilliant orange-red in color, dotted with maroon, with the tips a brighter red. They are from an inch and a quarter to an inch and three-quarters long. The size of the plants varies greatly. About the swamps they are often from one to two feet high and few-flowered, but along the banks of streams plants from three to five feet high and many-flowered are common. The bulbs of *L. parvum* are very small. Selected bulbs will not average above one-fifth of an ounce in weight, and measure an inch and a half in length by half an inch in width. They are rhizomatous, and thickly covered by three or four jointed scales which produce a beautifully-laced effect. They do not have runners like *L. Canadense*, nor do they ever branch and form mat-like clumps as is the habit of *L. pardalinum*. Not one bulb in 500 is branching or produces two stalks. Some years ago this Lily was distributed by Messrs. Hallock & Son, Queens, New York, under the name of *L. pardalinum*, var. *alpinum*.

In bulb, leaf and capsule *Lilium parviflorum* resembles *L. parvum*, but is stouter and larger, as a rule. In size the bulbs sometimes approach those of *L. pardalinum* in size, but the four-jointed scales and lace-like effects are constant features, and the bulbs seldom branch and never form the matted clumps so distinctive of the latter species. The stems may be very stout and tall, but the broader leaves, paler foliage and rounder, shorter capsule sufficiently distinguish it. There are many forms prevailing over more or less extensive regions. In some forms the flowers are as revolute as those of *L. pardalinum*, but they are smaller and fragrant, and this species comes into bloom several weeks before *L. pardalinum*. Mr. Baker says that *L. parviflorum* bears its flowers in an umbel, and I do not question the correctness of the statement as regards his specimen. Several Californian Lilies carry their flowers in umbels when there are few, and in racemes when there are many. Mr. Baker describes *L. rubescens* as umbellate, but it is only so when few-flowered.

The commonest form of *Lilium parviflorum* is the one distributed as *L. pardalinum*, var. *minor*, by some dealers, and still more widely sold as *L. parvum*. It has a flower like a small reddish orange *L. pardalinum*, and is found in the middle belt of the Sierra Nevada from Tulare County, in the south, to the base of Mount Shasta. Plants grown from bulbs collected at different points along this line are hardly distinguishable, and plants from Crater Lake, Oregon, seem identical. There is no reason to doubt that *L. parviflorum* in some of its forms extends into British Columbia, as mentioned in Baker's *Synopsis*.

On the Sierras, in Plumas County, especially on Lassen's Butte, *Lilium parviflorum* has subalpine forms which are indistinguishable from the typical *L. parvum* except that the flowers are tardily reflexed from the middle. For several days they are apt to remain broadly campanulate. In the same region the form is found described by me in *Erythraea* in October of this year as *L. parvum*, var. *luteum*, which, by the division of *L. parvum* that I now propose, would become *L. parviflorum*, var. *luteum*. This very handsome little Lily is like *L. parvum* in every particular excepting that the small revolute flowers are a clear orange-red, brightly dotted with scarlet.

I might mention that a clear orange form of the true *Lilium parvum* has been figured in Europe as *L. parvum*, var. *luteum*. It has funnel-formed flowers. The *L. Canadense*, var. *Walkeri*, of Baker's *Synopsis*, I have never seen, and there are doubtless many other transitional forms belonging to this group, but *L. parvum* and the type of *L. parviflorum* are practically all which have been cultivated thus far.

Ukiah, Calif.

Carl Purdy.

New or Little-known Plants.

Prunus Davidiana.

NUMEROUS references have been made in the columns of this journal to the beauty of *Prunus Davidiana* as a flowering plant. It is a small bushy tree, discovered

the tree and its flower-buds are very hardy, the flowers are occasionally killed by late frosts. *Prunus Davidiana* has fruited in Paris, and more freely in the south of France, but in this country it has not, so far as we have heard, produced any of its small thin-fleshed fruits, which have no comestible value. The pale pink and white flowers, however, are lovely enough to compensate for the want of fruit



Fig. 64.—*Prunus Davidiana*.

about thirty years ago by the Abbé David, who found it in the neighborhood of Pekin and also near Gehol, the summer residence of the Emperor of China. Botanically interesting as being somewhat intermediate in character between the Peach and the Plum, *Prunus Davidiana* is the earliest of all the Peach-like trees to flower in this climate, and, although

and make this one of the most desirable of small early-flowering trees.

Our illustration on this page, made from a photograph for which we are indebted to Mr. James M. Codman, of Brookline, Massachusetts, shows a bunch of flowering branches of this tree from the Arnold Arboretum.

Calopogon pulchellus.

SOME years ago one of the illustrated journals gave a sketch, with this legend: First tourist, "And how do you like Venice?" Second tourist, very bewildered, "Venice! why, is this Venice? I thought it was Milan; the itinerary says we are to be in Milan to-day." This is the typical state of mind of plant collectors who try to fit their newly-found plants to the descriptions found in either scientific manuals or popular hand-books. The description is grasped with a tenacity worthy of a better cause, while the charm of variation is quite lost sight of; consequently, when plants varying even slightly from the accepted description are found they are looked upon as something rare or unique.

The common descriptions of *Calopogon* usually read as follows: "Plant about one foot high, bearing from two to six flowers; color, magenta." *The Dictionary of Gardening* is even more modest and reduces the number of blossoms from "two to three," based on the plants figured in *The Botanical Magazine* of 1790*, which were the first specimens seen in England. Mr. Baldwin alone seems to really have seen *Calopogons* as they are commonly found, and in the *Orchids of New England* gives from three to nine blossoms as the ordinary number.

In the bogs of Adams and Franklin Counties, Pennsylvania, where they are very numerous, the plants vary from ten to twenty inches in height, and bear from six to fifteen flowers, eleven being an average number during midseason, both early and late ones having fewer blossoms. The season is longer than that of any other native Orchid, except the inconspicuous *Spiranthes*, and lasts from late in June until about the beginning of August.

The plants figured on page 505 were gathered late in June and represent the most ordinary specimens found by the hundreds in the South Mountain meadows. The coloration is generally given as "magenta," which seems to me too harsh a term, as they are only magenta when removed from their setting of bog-moss and grasses. The sepals and petals are usually of the same tone throughout, occasionally the wings are lighter, and generally the ridges of the labellum are white in their lower portion.

In a small area selected for daily observation, the plants ranged from one having pure white blossoms, with light green stigmatic surface and anther-lid, through very pale pink, to those with ordinary deep pink tones. The latter in almost every instance bore many more flowers than the paler specimens, the white one having only three blossoms, though these were of unusually large size. The deep-toned specimens averaged half as many filled seed-pods as there were blossoms; in no plant that was observed were all the seed-pods developed, and in no case at all of the white or very pale specimens were any seed-pods filled, or the pollinia even removed, so the attraction for insects appears to depend not only on the kind of color, but the degree, those having a purplish tone bearing more seed-pods. This agrees with the accepted theories of color, but other localities may show different results.

The *Calopogons* bear transplantation, and were not only grown in England a century ago, but are among the American Orchids mentioned by Mr. Meehan as having been successfully cultivated by the Comte de Paris (see page 484 of this volume of GARDEN AND FOREST). They are not among our most showy bog-plants, but they are certainly very pretty, with a certain distinction that entitles them to consideration as worthy of protection, for the meadows where they grow naturally are more and more disturbed by the plow, so that in a few years we shall look in vain for a single plant, where now hundreds may be found. This has happened with many of our wild animals which have been hunted to extermination, and is happening to more of our wild flowers than most persons realize. Unless those interested in the preservation of our native plants endeavor, as wild land is needed for cultivation, to transfer

to protected places some of our woodland and meadow beauties, we shall in a little time find them only in the botanical gardens of large cities.

Harrisburg, Penn.

M. L. Dock.

Correspondence.

An Amateur's Experiment.

To the Editor of GARDEN AND FOREST:

Sir,—The articles entitled "Harmony in Country Places," "Native Plants for Ornamental Planting," and "What Can be Done in Nine Years," in recent numbers of GARDEN AND FOREST, have reminded me in so many things of my own experience in endeavoring to carry out my plans for a suburban home, that I think some of your readers may be interested in a brief account of the results of seven years of experiment, and the methods by which comparatively satisfactory results have at last been reached. The term experiment should, in this case, be emphasized, since the undertaking was not only such at the beginning, but continues so.

Besides lack of previous experience in such matters there was much to contend with in the situation and other local conditions. The grounds slope rather steeply to the south, more gently to the west, and the terraces and banks face in the same directions, thus exposing the greater part of the surface to the summer's sun; besides, the ground being a very hard clay, overlaid by a few inches of excessively poor soil, or in places none at all, a far greater amount of rain or use of the hose is necessary than on a level or more friable surface. This disadvantage proved so serious that my choicest trees and shrubs were killed by drought during the five years when they were dependent entirely upon rain and water carried by hand, and each summer, after the middle of July, it was impossible to prevent the grass from burning to the roots on those portions of the lawn and terraces not protected by shade. Now, however, having Potomac water and some eighty feet of hose, nothing has been lost from drought within the last two years, and the lawn continues green until seared by freezing weather.

It should be mentioned that my place is a small one, only 150 feet square (appropriately half an acre in area), fronting for that distance on two streets, which form the west and south boundaries, the latter marking the lowest level of the plot. Crossing the lower portion diagonally a military road had been built during the war, leading to a fort which crowned one of the neighboring knolls. The grading of this road produced the only level ground on the premises, and likewise a bank averaging about three feet in height along the upper edge. The only fair-sized trees on the place grew upon this old road and below it, some dozen or fifteen slender and rather tall Scrub Pines (*Pinus Virginiana*), about forty to fifty feet high. Ranged along the top of the bank were four fine bushes of *Cornus circinata*, several young flowering Dogwood-trees, occasional clumps of smooth Sumach, a few other shrubs and young trees, a slender Persimmon-tree growing between two of the latter Pines and nearly of the same height, and a tangle of Greenbrier (*Smilax rotundifolia*) which overran a portion of the shrubbery and clambered into the lower branches of the Persimmon. From this fringe of shrubbery and small trees the slope leading to the upper limits of the place was covered with a jungle of young Scrub Pines, intermixed with Blackberry brambles, Sumachs (*Rhus glabra* and *R. copallina*), Sassafras sprouts, weeds and coarse grasses, and a few small Red Cedars.

The first step toward improvement consisted in the building of the fence, a procedure hastened by the discovery that my larger Pine-trees had been blazed, and a fine Cedar cut down by a small boy of the neighborhood, who had become the proud possessor of a new, and evidently sharp, hatchet. The fence consisted of Cedar posts set three feet deep and connected by wire netting four feet wide.* The glaring scars on the Pine-trees were coated with liquid grafting wax and have quite grown over. Soon after the fence was built roots of Japanese Honeysuckle were dug up from a piece of sandy ground in the neighborhood, where this hardy and beautiful climber had taken complete possession,† and planted on the inside, one at each post and one or more at the middle of each panel. These roots have developed, with assistance in the way of training and pruning, into a hedge which I believe cannot be surpassed in beauty, compactness and durability, and is far superior, in my estimation, to any hedge of shrubs which

* The height of the fence was afterward reduced to three feet by cutting off both posts and wire at the top, and the wooden top rails (2 x 4 scantling), which were continually sagging and rotting in the middle, replaced by double wire cable, which, besides being permanent, binds the posts together far more firmly.

† This plant is abundantly naturalized in the vicinity of Washington.

can be successfully grown in this climate, being entirely unbroken, quite evergreen, and deliciously fragrant when allowed to bloom.

terest to me of native plants as subjects of study and from past associations, the necessity of placing a definite limit to my selections, and last, but by no means least, a desire to show



FIG. 65.—*Calopogon pulchellus*.—See page 504.

It was my original plan to grow only native plants. This somewhat risky departure from prevalent custom was prompted by several considerations, chief of which were the greater in-

others how beautiful our native trees, shrubs and vines really are in cultivation. I was much disappointed that a suitable native woody climber could not be found with which

to cover the fence; but as one was desired which could be pruned closely into a formal compact hedge, none appeared to meet the requirements, at least among those whose hardness in this climate was not more or less doubtful.* A careful examination of the woody growth upon my lot revealed the presence of a very respectable nucleus for the collection which I proposed to make, the specimens marked for preservation numbering nearly two dozen species. Most of the trees were seedlings or of but a few years' growth, while none were more than thirty years old, the largest—the tall Scrub Pines before mentioned—having grown from a road constructed and used during the war. Adjacent unimproved grounds yielded about fifteen additional species, so that I had already at hand sixteen species of trees, eleven of shrubs and nine of woody climbers before recourse was had to the nurseryman.

With the exception of one *Gordonia Altamaha* and one *Catalpa speciosa*, nothing was purchased for the collection until the autumn of 1891, when a considerable number of species not obtainable in the neighborhood were planted; additions have been made each year, until there are now established on the place more than 130 woody plants which are native to the country east of the Mississippi River and south of the latitude of New York. Of these forty-eight are trees, fifty-seven shrubs and twenty-seven woody climbers. The number of herbaceous species is unknown to me, but these embrace many of the more interesting or beautiful kinds, as *Lilium superbum* and *L. Grayi*, *Trillium grandiflorum* and *T. sessile*, several Irises and Orchids, including *Goodyera pubescens* and the rare *Tipularia discolor*, here locally common; Lilies of-the-valley, from the mountains of North Carolina; Anemones, Buttercups, Violets, including the beautiful *Viola pedata*; several *Erythroniums*, *Aquilegia Canadensis*, *Dodecatheon Meadia*, *Dicentra eximia*, and many Ferns. Among the larger species the scarlet *Hibiscus* (*H. coccineus*), perfectly hardy here, is most conspicuous.

The number of species of trees may seem entirely disproportioned to the area over which they are distributed, but with very few exceptions the kinds selected do not attain a large size, trees of small growth, as Hawthorns (four species), flowering Crab, Flowering Dogwood, Hercules Club, etc., prevailing; hence it will be many years, if ever, before serious overcrowding becomes evident; and by judicious arrangement ample space for lawn and continuous vistas are not lacking. The shrubs are, of course, grouped or massed, and, therefore, do not take up nearly the amount of room that might be supposed. The vines, being supported by the trees, do not require extra space, all the larger trees being utilized for this purpose. The naturally bare trunks of the tall Pines are densely covered with the evergreen foliage of the Cross-vine (*Bignonia capreolata*), whose profusion of yellow and dark crimson flowers, hanging in wreaths and festoons, in early May glow brightly against their dark background. The same elegant climber clothes two good-sized Catalpas (*C. speciosa*) with its golden blossoms before the leaves of the trees are large enough to hide them, the great white panicles of the Catalpa appearing ten days to two weeks after the *Bignonia* has done blooming. Two rather short and wide-spread Pine-trees growing close together support not only the *Bignonia*, but also a *Clematis Virginiana*, which reaches to the topmost twigs. Other trees, chiefly Pines, are decorated with vines of the Trumpet-flower (two species or varieties), *Wistaria frutescens*, *Celastrus scandens*, Supple-jack (*Berchemia volubilis*), climbing *Hydrangea* (*Decumarea barbara*), *Ampelopsis cordata* and *Virginia Creeper*. In fact, climbers, both woody and herbaceous, have been used as freely as possible, not only on trees, but also on the veranda and on fences, and my chief regret is that suitable supports cannot be found for more of them.

Among the shrubs all the native wild Roses are represented, including the Cherokee Rose (here quite hardy and evergreen), trained over a rustic gateway, and several scandent clumps of the beautiful Prairie Rose, to my taste the most exquisite of all single Roses. All the Azaleas are likewise established, as well as *Rhododendron Catawbiense* and the *Rhodora*; but among them all there is no more charming shrub than *Chionanthus Virginica*, with its fragrant, lace-like flowers, or the graceful, wand-like *Neviusia Alabamensis*.

Unquestionably the finest trees in my collection are the even dozen Flowering Dogwoods (*Cornus florida*), all of which, with one exception, grew naturally from seed on the premises.

* Possibly the Carolina Jessamine (*Gelsemium sempervirens*), which has thus far proved hardy on my place, might answer, although its small narrow leaves are against the probability that it would prove satisfactory even if it would stand severe pruning. To those who prefer a vine-covered fence to a hedge of the usual kind the matter is well worth experiment, and I would suggest not only the above-named climber, but also several of the Green-briers, especially the evergreen and lower-growing species. *Bignonia capreolata* will not answer, its growth being too rampant, the same being true of the *Virginia Creeper*.

It is the only tree that has been duplicated except *Catalpa speciosa* and *Aralia spinosa* (of which three and two, respectively, have been allowed), and I would far rather materially reduce the number of species than sacrifice one of my Dogwoods. Having plenty of room, they have grown into wide-spreading symmetrical trees, and in early spring are masses of white bloom, one tree having flowers averaging nearly four inches across. The only Dogwood-tree not grown on the place is one of the pink-flowered variety, obtained from Meehan. This has proved to be all that has been claimed for this variety. Among other trees for which space has been found is the American Smoke-tree (*Cotinus Americanus*), much inferior in bloom to the European species, but equaled by no other tree of my acquaintance in the brilliancy of its autumnal coloring, its large oval leaves turning bright scarlet and orange. The Hercules Club (*Aralia spinosa*) is one of the prizes of my collection; it is decidedly more beautiful, both in habit, foliage and flower, than the Chinese form, yet not a single specimen can be found in the parks of Washington, where its foreign relative has been considered worthy of a place. Our *Aralia* is, with the exception of *Catalpa speciosa* and perhaps two or three of the *Magnolias*, the most tropical-looking of all our trees, and is of exceedingly rapid growth.

Among the discouraging disappointments and various backsets which have attended my horticultural efforts may be mentioned the loss by drought of all my *Andromedas*, *Kalmias*, *Rhododendrons*, *Stuartias*, *Gordonia Altamaha*, *Hydrangea quercifolia* and many other of my choicest shrubs and young trees; the yearly blighting and disfigurement of the coral Honeysuckles by aphides and defoliation of wild *Clematis* by bugs; the ruin of the *Robinias*, especially the two arborecent species, by borers, while borers of another kind have destroyed, one by one, about half of the large Pine-trees; the stems of *Euonymuses* and *Celastrus* are encrusted with bark lice, just as they have attained a luxuriant growth, and they probably will have to be cut down and burnt; the larvæ of June-bugs have made havoc with the lawn, while the beetles themselves have mutilated the foliage of the young Oaks; rose-beetles last May utterly destroyed the unusually abundant blossoms of several large shrubs and of a Washington Thorn before they could make any show; all my Hawthorns and flowering Crab are infested with the Cedar fungus; *Cypripedium* spectabile will not bloom for me—the roots live and the leaves appear each spring, but before any flowers appear the stem rots off close to the ground; and the seeds of many herbaceous plants (*Lobelia cardinalis* among the number), repeatedly sown, refuse to germinate. Again, dealers persist in sending me what I do not order, so that my Sweet-shrub turns out to be another species with ill smelling flowers, though finer foliage (*Calycanthus lævigatus*), *Lonicera flava* becomes the yellow-flowered variety of *L. sempervirens* or else *L. glauca*, *Cocculus Carolinus* invariably puts out leaves of *Menispermum Canadensis*, and even *Trillium grandiflorum* comes up an unattractive Siberian plant for which I have no use.

Some things, however, have grown with a rapidity that is surprising, a *Catalpa speciosa* being the most remarkable example. This was discovered by accident in the fall of 1890, a natural seedling of that year, quite hidden by weeds and coarse grass of the then uncleared ground. In 1892 it bore two large panicles of flowers, and each succeeding year an increased number, the last two or three years producing a full crop of its showy and individually beautiful blossoms. It is now a sturdy tree twenty-two feet high, with a spread of twenty feet and a trunk girth of two feet.

Transplanting has been done both spring and fall, but the latter is beyond question the best season in this climate for most trees and shrubs. Such work has, however, frequently been carried on nearly throughout the winter, whenever the weather and condition of the ground were suitable; and one of the largest deciduous trees on the place, a Black Locust (*Robinia Pseudacacia*), was taken up from the woods and replanted January 16th, 1891. The great benefit of cultivating, manuring and (in summer) mulching around trees and shrubs has been very evident, specimens thus treated having in the same time grown far more rapidly than others of the same kind around which the grass was allowed to grow. Each spring, in March, a circle nearly equal to the ambitus in the case of the smaller trees, but of less extent for the larger ones, is carefully dug up round the base, and given a covering several inches deep of well-rotted cow-manure. In watering during very dry seasons a basin is made around each tree and filled from the hose, allowing the water to sink in and then refilling, until the earth about the roots is well saturated. The soil is then drawn back and covered with a light mulching of

dry grass cuttings or pine needles. One such thorough watering is quite sufficient to carry a tree in good condition through any ordinary season of drought.

Now, near the end of the seventh year of my experiment, I can look back and, through the many mistakes that have become evident, see how various things should have been done at the start. Most of them can be remedied, some of them cannot. Much work remains to be done in the way of transplanting, for at first, according to the custom of most amateurs, trees were planted much too near together and without due reference to their artistic arrangement. One tree intercepts what without it would be a beautiful vista; another is already bending away from the larger growth on one side, and certain shrubs whose mature stature had been underestimated, have quite outgrown the limits assigned to them. At the end of the last transplanting season I was congratulating myself that the hard work was practically done, and I had now before me only the pleasure of watching the progress of my plants; but one summer's growth has quite dispelled this illusion, and the approaching autumn will be scarcely less notable than preceding ones in the amount of digging and changing things about. This would be most discouraging were it not also evident that my ideal, while by no means yet attained, is (barring limitations which preclude the possibility of actual attainment) each year less remote.

Brookland, District of Columbia.

Robert Ridgway.

Recent Publications.

The Geographical Distribution of Forest Trees in Canada.

By Dr. Robert Bell.

This is a paper read a few months ago before the Scottish Geographical Society, and now issued in separate form from the *Scottish Geographical Magazine* of June, 1897. Dr. Bell has had exceptional opportunities for studying the northern distribution of the Canadian trees, as for forty years he has been engaged every year in exploring, in connection with the Canadian Geological Survey, the extreme northern regions of the continent east of the Rocky Mountains. In 1873 Dr. Bell prepared a map showing the northern limits of the principal trees in the four original provinces of the Dominion, and in 1879 a reduction of this sheet was published in the Report of the Montreal Horticultural Society and Fruit-growers' Association; and in the Report of the Canadian Geological Survey of 1882 he joined to another map a paper containing the latest information upon the northern range of thirty of the principal forest-trees which grow in Canada east of the Rocky Mountains. The present paper, which is accompanied by a map on which the northern distribution of these thirty trees is marked, must be considered a supplement to Dr. Bell's earlier papers, and contains the results of his own observations and those of other travelers and explorers in the far north during the last seventeen years, and these probably in the case of several of the species, at least, must be considered final; although such a comparatively small part of the interior of Labrador has yet been explored, that some changes in the limit-lines now laid down by Dr. Bell for that part of the country will doubtless be needed.

Dr. Bell has had so much experience and has studied so carefully the distribution of Canadian trees and the causes which control their different ranges that his conclusions are extremely interesting and valuable. He finds, for example, that "in approaching their northern limits some kinds of trees become gradually smaller and smaller, and are finally reduced to mere bushes before they disappear altogether, while others terminate abruptly or without any apparent diminution in the average size of the individual trunks. The latter habit is commoner in the southern than in the northern species, and it appears to prevail more in the eastern than in the western parts of Canada." He finds, too, that "it is probable that those trees which bear large numbers of seeds capable of being carried for some distance by the wind, such as the conifers and the Poplars, have now reached the extreme northern limits of their growth, but some other species may be continuing to extend their borders. Indeed, the general tendency appears to be to advance still farther north, as if many kinds of our

trees had not yet had sufficient time to occupy all the territory congenial to their existence." In support of this theory Dr. Bell cites successful experiments which have been made in growing the Black Walnut in the neighborhood of Quebec, although the nearest place where this tree grows naturally is 500 miles farther to the south-west, showing that the range of this tree is capable of being extended over a much greater area than it yet occupies naturally. On Pelee Island, in Lake Erie, the most southern point in Canada, is the only place in the Dominion where the Honey Locust and the Kentucky Coffee-tree are known to grow naturally, although the former flourishes wherever it has been planted through the Ontario peninsula and down the St. Lawrence nearly to Montreal, and the Kentucky Coffee-tree grows to a large size in Ottawa. The Negundo, which has not extended its natural range east of the western end of Lake Superior, grows as well in Montreal, 900 miles further east, as it does in Manitoba, and the Black Ash is perfectly hardy on James Bay, 100 miles to the north of its natural range.

This ability of various trees to grow far from their existing homes is not attributed by Dr. Bell to any change of climate since they attained their present range, as there is no meteorological proof of such improvement, but because sufficient time has not elapsed to permit the "fullest possible territorial expansion of all the species. When frost alone operates to check the northward extension of a tree, there would appear to be no reason why such a species should not grow as far in that direction as it can ripen its seeds, even once in a number of years. When early frost happened to coincide with good seed years many seasons might intervene between crops of ripe seeds, and the natural progress of northward extension would be very slow. The Red Oak, which requires two seasons to ripen its fruit, would suffer a double disadvantage." Dr. Bell notices that the Beech, Elm and Black Ash seldom bear any fruit toward the northern limits of their range.

It is interesting to read that Dr. Bell considers "the greater dryness of the region between Red River and the Rocky Mountains is one of the principal causes of its treeless and partially treeless condition." The former country is called plain and the latter prairie. The other principal cause is the extremes of heat and cold. Some persons have jumped to the conclusion that the plains and prairies have resulted from repeated fires burning off pre-existing forests in modern times. If this were the case the tree-lines in their general westward course would all end abruptly at the edge of the burnt space, and some traces of the various species would still be found in the prairie region. But, instead of this, on approaching the prairie country they all curve gradually to the southward in a concentric fashion, so that what was the northern limit of each successive species now becomes in turn its western boundary. But if other evidence be required it may be found in the prairie flora, the absence of hollows with hillocks accompanying them, left by the bodily upturning of the roots of trees with a large quantity of earth attached, which are always to be found where forests have grown; the comparative scarcity of water courses, and the prevalence of regular rings of boulders around the edges of the nearly circular ponds which have resulted from the action of ice in a treeless region."

While it is probable that the treeless condition of the northern extension of the prairie region and of the plains as distinguished from the prairies, is due to insufficient moisture and to cold, it is evident that the absence of trees from the comparatively well-watered prairie regions of the United States can be largely ascribed to fires, which if they did not originally destroy the forest covering, have certainly prevented a growth of trees, because when the annual burning over of the prairies stopped with the settlement of the country by the whites, trees soon covered or attempted to cover the surface of the ground wherever there was sufficient moisture for tree-growth.

Unfortunately space will not permit us to make longer

in Dr. Bell's paper, which those interested in the subject will find one of the most important contributions to the knowledge of the distribution of the trees of north-eastern North America which has been made.

Notes.

Mr. J. G. Luehman, for twenty-eight years the assistant of the late Baron von Mueller, succeeds him as Government Botanist of Victoria, and has now been placed in charge of the National Herbarium of Melbourne, with the title of Curator.

A brilliant effect was produced in the table decorations at a private dinner in this city last week by the use of nearly 500 bracts of Poinsettia, which, in five baskets, were arranged on a bed of Asparagus. Many of the bracts measured from eighteen to twenty inches across.

With the completion of the third volume, *The Forester*, an illustrated monthly journal of Forestry, passes from the control of Mr. John Gifford, of Princeton, New Jersey, and in future will be published by the American Forestry Association. The new office of *The Forester* will be at No. 73 Cochran Building, Washington, District of Columbia.

The proposition to perpetuate the memory of William A. Stiles and his labors in behalf of the parks of New York, by naming one of the new small parks for him, has received the endorsement of many of the most prominent professional and business men of this city, whose Memorial has been presented to the Park Commissioners, with whom it rests to pay this fitting tribute to their late associate.

A Catalogue of Fruits has recently been published by the Division of Pomology of the United States Department of Agriculture. This useful and valuable bulletin is the work of a committee of the American Pomological Society, of which Mr. T. T. Lyon was the chairman. Such species and varieties of fruits and nuts as are recommended for cultivation in the United States and in British America are arranged in three divisions: Fruits mainly adapted to northern localities; subtropical and tropical fruits; native and introduced fruits and nuts grown in the open air. The entire region is divided into fifteen pomological districts, with primary reference to the influence of latitude, elevation, prevailing winds and oceanic and lacustrine exposures upon their adaptation to pomological pursuits. Comprehensive and carefully arranged tables show the size, form, color, texture, flavor, quality, season, use and origin, besides the districts in which a particular fruit succeeds.

Mr. James Bateman, who died at Spring Bank, Worthington, on the 27th of November, in his eighty-seventh year, will be remembered as one of the first and most enthusiastic cultivators of Orchids and as the author of *The Orchidaceae of Mexico and Guatemala*, perhaps the most sumptuous and splendid volume which has been devoted to plants. This consists of a series of colored illustrations of life size of a large number of species of Orchids, with descriptive titles and cultural hints to which are added notes, literary, scientific, archaeological and ethnological, the whole work being enlivened by humorous sketches and tale pieces from the pencil of George Cruikshank himself. Forty years ago Mr. Bateman's gardens at Biddulph Grange and Knypersley were famous all over Europe, with their Chinese garden, in which the scheme of a Willow-pattern plate was reproduced, their Egyptian court, their avenue of Sequoias, their groves of Sikkim Rhododendrons, their bulb gardens, Rose gardens, Dahlia gardens, their pinetum and their great collection of Orchids. This last, when Mr. Bateman came to reside principally in Kensington, he presented to the Royal Horticultural Society, to which for more than fifty years he was zealously devoted. His portrait, taken in 1871, is published in *The Gardeners' Chronicle* of December 4th.

At a secret session of the Board of Park Commissioners of the city of Buffalo, held on the 7th of December, Mr. William MacMillan, for twenty-six years the superintendent of the Buffalo parks, was summarily dismissed without even being informed of the nature of his offense. There have been differences of opinion between individual members of the Buffalo Park Board and its superintendent as to the wisdom of permitting the erection in the parks of museums and other buildings not intended for park purposes, and in some other matters about which we do not know all the details. No question, however, has ever been raised as to the strict honesty

and conspicuous ability of Mr. MacMillan's administration. No one has ever doubted his integrity and entire devotion to the best interests of the city of Buffalo, and if, in opinion, he has differed from his commissioners in matters of park administration, he has, we feel confident, been governed solely by his sense of duty to the public. To those who know the Buffalo parks, that city has always appeared particularly fortunate in its park superintendent, who has shown himself one of the best park managers we have ever had in the United States, honest, intelligent, faithful and unbending to the improper demands of the spoilsmen. That the value of his services was appreciated by the people of Buffalo is shown in the numerous letters deploring the unprecedented action of the Park Commissioners, which have been published during the last two weeks in the journals of that city.

In a recently-issued circular, Mr. A. M. Herr, Secretary of the American Carnation Society, names, among the most popular varieties of Carnations now grown, Flora Hill as the best white sort; Harrison's White, Lizzie McGowan, Alaska, Mrs. Fisher and Nivea are other good white varieties which succeed under certain conditions. Mr. Herr considers the pink Triumph superior to William Scott for size of flower, productiveness and keeping qualities. William Scott and Daybreak are ranked as standard kinds. New varieties in this color are Emma Woche and Victor. Abundance is recommended as a small flower for summer. Jubilee is considered the most brilliant scarlet, and Portia and Garfield are listed in this color. Buttercup is praised among yellow varieties, though it blooms sparingly. Eldorado is stated to be the only Carnation of this color which flowers freely enough to be a commercial success. The new Yellow Jacket carries abundant blooms, but is subject to rust. This disease is not considered a serious matter by Mr. Herr, as, notwithstanding its general prevalence, Carnations are improving. Another new yellow variety, Mayor Pingree, promises to bear freely. Iago, Anna Webb, Maceo and Empress are considered the best of the crimson varieties. Helen Keller and Armazindy are praised as the foremost among striped Carnations. The latter is described as bearing flowers of excellent form on stiff stems; not quite as bright as Helen Keller, and the most floriferous of all Carnations. Thomas Cartledge is said to be the only cerise Carnation which it pays to grow for the trade. Daybreak leads among salmon or light pink varieties, and Mrs. McBurney, one of Mr. Hill's introductions last year, is favorably mentioned.

The decks and saloons of the steamer "Magenta," from Keyport, New Jersey, have been crowded with fragrant stacks of manufactured Christmas greens during the past fortnight, and the volume of business has increased steadily until to-day, when the height of the season in the wholesale trade is reached. Nearly all the roping and designs used hereabout come from this portion of New Jersey. Roping has been in special demand this season, and that made of Ground Pine has found ready buyers at from \$1.75 to \$2.00 a hundred yards for the smallest size. Laurel roping is plentiful and may be bought in wholesale lots at from \$1.00 to \$2.00. From 10,000 to 15,000 yards of roping are used in the holiday decorations of each of several large department stores in this city, and churches have been more liberal customers than in recent years. The supply is ample, however; one manufacturer alone has more than twenty workers busily employed in Keanesburg, and besides hundreds of dozens of set pieces, has made up 100,000 yards of roping. Early snows in New Hampshire and Vermont, the region from which much of the Ground Pine is obtained, are responsible for a scarcity of material, as for its dull color. Stars and wreaths made of this graceful creeper are the most costly. Box, which is becoming scarcer each year, is used effectively in combination with grayish lichens, and sometimes the glossy leaves, with their aromatic suggestion of old gardens, are less pleasingly arranged as a foil to bright-colored immortelles. The available supply of Holly is more meagre than last year, but it is profusely berried, and some Holly from the neighborhood of Greenwich, Cumberland County, New Jersey, is unusually handsome, with large brilliant fruits. Loose branches, in cases, are coming from Delaware. Small wreaths made of Holly cost wholesale buyers from forty to eighty cents a dozen on the "Magenta." The supply of these wreaths from Keyport will be smaller than that of last year by from 2,000 to 3,000 dozens. Excepting the increased sale of roping and the manufacture of many large pieces in the design of stars there is no noticeable change in this industry. The season of the wholesale trade practically ends to-day, and the city dealers will be busy from now until Christmas eve disposing of their stock to housekeepers and other retail buyers.

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American Trees for America.

LOOKING at the matter broadly, comparatively little, in northern countries at least, has been accomplished toward beautifying the earth's surface by transferring trees from one region to another, although a great deal of time, energy and money has been expended during the last two hundred years in the attempt to do it. It has given to Europe from America the Locust, the great southern Magnolia, the Negundo, the White Pine, several California conifers, the Arbor Vitæ, one or two Thorns, and the Stag-horn Sumach, as truly permanent and valuable additions to the native silva; China has really enriched Europe, as it has eastern North America, with the Ginkgo, the Ailanthus, the Paulownia, the Yulan Magnolias, the Weeping Willow and the flowering Apples; western Asia has sent to Europe the Cedar of Lebanon, the Oriental Plane, the Oriental Spruce and the Cypress, while experiment has shown that of the trees of Europe and western Asia only the White Willows, the Beech, the Elm, the Norway Maple, the Oriental Plane, the Larch, the Box, the Hawthorn and the Mountain Ash can really be depended on in the eastern states to live out their lives in health and beauty. These results may appear small to economists, but certainly all the effort that has been expended in testing exotic trees in Europe and America has been well repaid in the stimulus it has given to the study of botany, in the increase of knowledge and in its few really important practical results. Still, the lesson to be drawn from these two centuries of effort is clearly that the best trees to plant in any particular region are those that grow and thrive naturally in that region. No teacher in such matters is so wise, experienced and unprejudiced as Nature herself, and when her teachings have been followed the best results from tree-planting have always been obtained. The Elms and Maples taken from adjacent swamps and hillsides, which grace the streets of many New England country towns and adorn many New England homesteads, and the Magnolias, Live Oaks and Water Oaks in the streets and gardens of the south testify to the value of native trees; and in England, too, it is the native Oaks, Elms and Beeches which give its distinctive aspect to the land and make its parks the most dignified in the world. Fortunately, in this

country it is not difficult to apply this rule, for no other land is blessed with such a rich, varied and splendid silva. In the southern United States the great evergreen Magnolia, the most beautiful of the broad-leaved evergreen trees of the northern hemisphere, the Live Oak, the Water Oak, the Laurel Oak, the Pecan and noble Bay trees, are available for the planter. In the Pacific coast states the conditions are somewhat different; the number of native trees is smaller than it is in the east, and many of the finest of these are found naturally only at high elevations and cannot be successfully cultivated in the warm, dry valleys in which the people of these states have principally established their homes. Some of the trees which grow in the valleys spontaneously are not ornamental, and are often difficult to cultivate, but some of the noble California Valley Oaks surpass in stately beauty any exotic trees which are likely to flourish in that peculiar climate, and two California conifers, the Monterey Cypress and the Monterey Pine, are generally and successfully grown from Vancouver Island to San Diego. These are both beautiful trees, but California will doubtless always be obliged to depend on other parts of the world for many of her ornamental plants. The trees of the eastern states do not flourish west of the Rocky Mountains; it is not probable that those of Europe or Asia will ever gain much foothold in the soil of California, and it is to Australia, Mexico and other dry countries that California planters will continue probably to derive much of the material needed for the decoration of their parks and gardens.

It is in the eastern and middle states, however, where there is a greater interest in ornamental planting than in other parts of the country, that most is to be obtained from the native silva. That of no other part of the world is richer in handsome trees. From its Magnolias, Oaks, Hickories, Walnuts, Elms and Ashes, its Tupelo and stately Tulip-tree, its Rhododendrons and Mountain Laurels, its Birches and Lindens, its Coffee-tree and Honey Locust, its Sourwood and Sassafras, its Beech, Chestnut, Yellow-wood and Wild Cherry, its Catalpas, its Persimmon and Silver-bell tree, its Flowering Dogwood and Fringe-tree, its Liquidambar and Hackberry, its Sumachs, its Wild Crab and its Hawthorns, planters of deciduous-leaved trees can choose material enough to satisfy every taste and fill every requirement. And among coniferous trees none is more picturesque in youth or more stately at maturity than the northern White Pine, more graceful than the Hemlock, or more symmetrical and enduring than the Red Cedar.

In the past our gardens have suffered from the general ignorance with regard to the true beauty and value of native trees, which appears to have been peculiar to us as a nation. Too often the planter, unable to obtain American trees, has had to rely on the Spruces, Oaks, Ashes, Maples, Pines and other trees of Europe, and these are still too largely used in this country, although it is now known that they are entirely unsuited to our climate and that where they have been used in public parks they must soon be replaced by native species. The lesson has been a costly one, but the experience has not been dearly purchased if we have finally come to realize that Nature has placed for us in America a greater number of beautiful trees, large and small, than is found in any other part of the world, and that American trees are the best for America.

Notes on Cultivated Conifers.—XIII.

ABIES, the name now given to the Silver Firs, is one of the widely distributed coniferous genera with a larger number of species than any other except Pinus. It is well characterized by its flat or more or less quadrangular leaves, without persistent woody bases, spreading on lateral branches in two ranks and leaving in falling nearly circular scars, scattered axillary male flowers, erect cones usually produced only on the upper branches and maturing in one season, their thin entire, rounded scales being often shorter than the bracts, and separating at maturity from the

central axis of the cone. *Abies*, which is usually found on the slopes of high mountains, is represented in North America by ten species, seven of them belonging to the flora of the Pacific states and one to Mexico; it is common in Japan with several species, and is widely scattered over Siberia, the Himalayas, Asia Minor, central and southern Europe and northern Africa. The Silver Firs are pyramidal trees with small branches arranged in regular whorls and usually thin bark filled with large conspicuous resin vesicles; some of the species grow to a very large size, especially those of western America, and others are valuable timber-trees. No genus of conifers probably has contributed more to the beauty of gardens, for nearly all Fir-trees are extremely handsome while young. Their tendency, however, to become thin and lose their lower branches early when they are taken from cool mountain slopes makes the first thirty or forty years of the lives of these trees the most attractive period of their garden career.

The species which grows in the swamps and on the mountains of the north-eastern part of this continent from Labrador and the shores of Hudson's Bay southward to the high mountain peaks of Virginia, the so-called Balsam or Balsam Fir (*Abies balsamea*), is a beautiful tree while it is small, with lustrous foliage and dark purple cones. Its beauty, however, is short-lived in cultivation, and the tall, narrow, scrawny Balsams still so common in the neighborhood of New England farmhouses show how worthless it is for any scheme of permanent decoration. The dwarf spreading Silver Fir, only a foot or two high, frequently cultivated under the name of *Abies Hudsonica*, although it has not produced cones and nothing is known of its origin, is probably a depauperate form of *Abies balsamea*. Beissner describes a number of other seminal varieties of this tree which are grown in Europe, but I have never seen any of them. A seedling form sent several years ago to the Arnold Arboretum by Robert Douglas is distinct in its broader and more crowded leaves.

The second eastern American Silver Fir, *Abies Fraseri*, a small tree found only on the highest slopes of the southern Appalachian Mountains, will probably not be of more permanent value here as an ornamental tree than the northern Balsam, from which it chiefly differs in the long exserted recurved bracts of the cone-scales. The southern tree appears to have been common in European collections about the beginning of the century, and then probably entirely disappeared from gardens, as for many years seeds of *Abies balsamea* were sold for those of *Abies Fraseri*, and most of the plants now cultivated under that name are certainly wrongly named. For nearly twenty years, however, *Abies Fraseri* has been growing in the Arnold Arboretum, where it is perfectly hardy, produces cones and is still good-looking.

Of the Silver Firs of western America the most valuable here as a garden plant is *Abies concolor*, the White Fir of the southern Rocky Mountains, of the California Sierras, of the Pacific coast ranges, of many of the interior mountains of the south-western states and of northern Mexico. No other *Abies* flourishes in such hot, dry regions or has been able to sustain itself among such climatic hardships; and it is not surprising that a tree, which is equally at home in the sea-fogs which sweep in from the Pacific over the California coast ranges as it is on the mountains of Lower California, southern Arizona and central Colorado, should find little to fear from the cold blasts and hot summers of New England. Both the California form, with its rather shorter and greener leaves, which in England is still called *Abies Lowiana*, and in this country sometimes *Abies Parsonsii*, and the handsomer Colorado form with longer blue leaves, are perfectly hardy in New England. The oldest specimens here of the California tree are already becoming somewhat thin and are beginning to lose their lower branches, and so have passed the period of greatest beauty. The largest of the Colorado plants, however, in eastern gardens, which are now probably twenty-five feet in height, are still perfect in habit and density of foliage, surpassing

in vigor and in loveliness of form and color all the *Abies* hardy in New England, and are still as full of promise as trees of the same age in sheltered ravines of the Rocky Mountains. However ugly and unsatisfactory old trees of this Fir may become here later, it deserves a place in every garden for the beauty of its early years.

None of the other western American *Abies* promise to be of much value to us here in the east. *Abies lasiocarpa* (*A. subalpina* of Engelmann), which is the most widely distributed of the North American species, ranging as it does from Alaska southward over all the high interior mountain systems to northern Arizona, has been cultivated for many years in the Arboretum, where it is perfectly hardy, but grows very slowly, forming here broad compact pyramids of pale blue-green foliage. A tree of the north and of high mountains, where it grows up to the timber-line, *Abies lasiocarpa* will probably never attain at the sea-level a large size or show the narrow spire-like pointed head of dense foliage which makes this tree such a beautiful object in the alpine forests of the west and the not unworthy associate of the lovely Patton's Spruce. Among the seedlings raised at the Arnold Arboretum is a plant of this *Abies* which has remained a low flat cushion only a few inches in height, which now promises to be one of the most attractive of the dwarf hardy conifers.

Abies amabilis, *Abies nobilis*, *Abies magnifica* and *Abies grandis*, the four largest Fir-trees in the world, can be kept alive here in sheltered positions, although none of them will probably ever be of any permanent value in our plantations. Of these four trees *Abies nobilis* of the mountains of Oregon and Washington is, perhaps, the hardiest, and fairly healthy specimens can occasionally be found in eastern gardens. *Abies amabilis*, which has always grown badly in cultivation, even in Europe, is a more northern tree. It grows, however, very slowly in the eastern states, and gives little promise of ever becoming large enough to show its true character and beauty. The other American species, *Abies venusta* of the Santa Lucia Mountains of California, the least widely distributed of all the *Abies*, and *Abies religiosa* of Mexico, are too tender for New England and the middle states, so that of the ten American species only *Abies concolor* is really valuable in eastern gardens where, moreover, it will possibly be beautiful only during the years of its early vigor.

In Japan there are probably only five species of *Abies*, although a number of others have been described at different times. These trees are all hardy in New England, where they grow with varied success. The largest and most beautiful of the Japanese Firs is *Abies firma*, which I have seen in Japan only in cultivation, when it often attains a height of 120 feet and produces a tall straight stem from four to six feet in diameter. As it grows in temple gardens near Tōkyō, where the climate is not very unlike that of Charleston, South Carolina, it is the handsomest of all Firs, distinguished by nobility of port and bright green and very lustrous long rigid leaves which are sometimes sharply pointed and sometimes notched at the apex. This beautiful tree has generally proved a disappointment in the United States and Europe. It is very hardy even in eastern Massachusetts, where it grows rapidly and where in the Arboretum it has produced cones. In this country, however, it is almost always ragged and miserable in appearance, and it evidently needs a warmer and moister climate than that of the northern states to develop its beauties.

Abies homolepis, which is usually cultivated in our gardens under the name of *Abies brachyphylla*, is the common Fir of central Japan, where it abounds at elevations between 4,000 and 5,000 feet above the sea, and where it is scattered singly or in small groups through the Birch and Oak woods which exist just below the subalpine Hemlock forest belt. It is a massive, although not a tall, tree, and in old age is easily distinguished from all other Firs by its broad round head, the branches near the tops of the trees growing more vigorously and to a greater length than those lower on the

stems. This peculiarity is seen even in the young plants in our gardens, on which the short lower branches are usually soon shaded by those above them. The pale bark, long crowded leaves, dark green on one surface and silvery white on the other, and the large purple cones make this a beautiful tree. It grows here very rapidly and is perfectly hardy, but probably will be early disfigured by the loss of the branches near the base of the trunk. *Abies Veitchii* forms forests of considerable extent on the high slopes of Fugi-san and is another handsome tree with lustrous dark green leaves, silvery white below. From *Abies homolepis*, to which it bears considerable resemblance, it may be distinguished by its shorter and more crowded leaves, by its more slender branches coated with fine pubescence, and smaller cones. This tree was sent to the Parsons Nursery in Flushing nearly forty years ago by Mr. Thomas Hogg, and was cultivated in the United States under the unpublished name of *Abies Japonica* for many years before it was introduced into Europe. It is very hardy in eastern Massachusetts, where it has produced cones, and in its young state, at least, is an exceedingly beautiful tree of slender pyramidal habit and dense lustrous foliage.

Abies Mariesii, which appears to grow only on a few of the high mountains of northern Hondo and at one point on the southern coast of Yezo, is a compact, shapely pyramidal tree forty to fifty feet in height, with crowded branches covered with short, dark foliage, pale below and abundant large dark purple cones. In this country and Europe, although it appears to be hardy enough, *Abies Mariesii* is a feeble grower and gives little promise of success.

The Silver Fir of Yezo (*Abies Sachalinensis*) is a tall pyramidal tree with pale bark, long slender dark green leaves and conspicuous white buds which make it easy to distinguish this species at any time. It is not rare on the hills of central Yezo, and in the northern part of that island and in Saghalin it is said to form great forests. In the neighborhood of Boston, where it is very hardy, *Abies Sachalinensis* grows more rapidly than any of the other *Abies*. The largest plants are, however, only five or six feet high and too young, of course, to give any idea of the permanent value here of this tree.

In China *Abies* is less common than it is in Japan, although a still little-known species has been found by Dr. Augustine Henry on the mountains of Hupeh, in the central part of the empire. Further north the Silver Fir of Siberia (*Abies Sibirica*) ranges eastward to the valley of the Amoor River and to Kamtschatka. This is a very hardy tree in New England, of slender pyramidal habit and narrow dark green lustrous leaves, in form and color not unlike *Abies Sachalinensis*. I do not know that it has produced cones here yet, although the largest trees are from twenty-five to thirty feet in height and have already passed the period of their greatest beauty. This is one of the earliest of the Silver Firs to begin its growth in the spring, and in western Europe it is often injured every year by spring frosts. The Himalayan Fir (*Abies Webbiana*), which sometimes grows to the height of 150 feet, with a trunk ten feet in diameter, and is distributed from Bootan to Afghanistan at elevations between seven and thirteen thousand feet above the sea, is one of the handsomest of the whole genus, with leaves which are dark green and lustrous on one side and silvery white on the other, and large bright purple cones. This tree grows only moderately well even in sheltered positions in western Europe, where it frequently suffers from late spring frosts, but in some of the gardens of southern France and northern Italy it appears to be perfectly at home. I have never seen a specimen in this country, and the Himalayan Fir would certainly not be hardy in the north-Atlantic states. In south-western Asia and south-eastern Europe there is an interesting group of *Abies*. The most widely distributed and best known of these trees is the common Silver Fir of Europe (*Abies pectinata*), which is distributed from central France to middle Russia, and grows also on the mountains of Macedonia and Greece and on some of those of the eastern provinces of Asia Minor. This is the

Silver Fir of the silviculturists of central Europe, who consider it a valuable timber-tree, although the wood which it produces is inferior to that of the Spruce. Long a popular ornamental tree in England, *Abies pectinata* was probably first brought to this country nearly a century ago. It has never proved very successful here, although occasionally a healthy specimen fifty feet high or more can be found in some old garden of the middle states. In New England, except in very sheltered positions, it suffers from the cold and usually disappears at the end of a few years. Among several abnormal forms of this species the most distinct is the variety *pendula*, a handsome tree with distinctly pendulous branches; variety *nana*, a handsome bush, which in time often loses its dwarf habit and grows into the normal form, and the variety *columnaris* with erect branches pressed closely against the stem and short crowded leaves.

Another of this group, *Abies Cephalonica*, is a distinct-looking tree with branches long in proportion to the height of the stem and crowded rigid sharp-pointed leaves. It is a native of Mount Enos, on the island of Cephalonia, and has been an inhabitant of English gardens since 1824. The Cephalonian Fir is quite hardy in eastern Massachusetts, and there are specimens in Mr. Hunnewell's pinetum which are from thirty to forty feet in height and have produced cones for several years. Large plants in this country, however, are not handsome, and the Cephalonian Fir is probably one of the least desirable of the genus as an ornament of our gardens. *Abies Apollinis* and *Abies Regina-Amaliae*, natives of the mountains of Greece, are usually considered merely geographical forms of *Abies Cephalonica*; they are both hardy here in a young state and the largest plants which I have seen in this country, still only a few feet high, are handsome. *Abies Nordmanniana*, another of the Silver Firs of south-western Asia, has been the most generally planted of all the Old World *Abies* in the northern states, where it has proved very hardy and one of the most beautiful and satisfactory of the exotic conifers which have been tried here. The largest plants in the eastern states are now from fifty to sixty feet in height and are still well furnished with branches clothed with beautiful crowded leaves dark green and lustrous above and silvery white below. The Nordmann Fir is a native of the mountain forests east and south-east of the Black Sea, including the western spurs of the Caucasus, and in its native country it is said to grow to the height of 150 feet, with a trunk five or six feet in diameter, in forests of Oaks, Hornbeams and other deciduous-leaved trees. A number of seminal varieties which I have not seen are cultivated and described by European nurserymen.

A more beautiful tree, perhaps, at least in its young state, than the Nordmann Fir, although still much less well known in American gardens, is the Cilician Fir (*Abies Cilicica*), a more southern species confined chiefly to high elevations on the Taurus and anti-Taurus, where it is the companion of the Cedar of Lebanon, and to the Lebanon range itself. Rarely seen in western Europe, where it suffers seriously from spring frosts, the Cilician Fir grows admirably in New England, where it forms splendid broad-based, dense pyramids covered with lustrous narrow leaves conspicuously marked with pale stomata. This is a difficult tree to obtain; it has not been long enough in this country to produce seeds here; apparently they never ripen in western Europe, and it seems impossible to obtain them from the remote and inaccessible forests which are the home of this tree.

The handsome Algerian Silver Fir (*Abies Numidica*), which grows well in England and some parts of France, is probably nowhere hardy in the northern states; and the beautiful Spanish and north African *Abies Pinsapo*, which is one of the handsomest conifers cultivated in central and western Europe, where it has already grown to a good size, can only be kept alive here in sheltered situations, and will never show its real beauty in the northern states.

This brief review of the species of Taxids and Conifers which have been tried in our gardens, or which are likely

to succeed here, shows that the number of species of these great families which can be really depended on to grow permanently in this part of the world is a small one. *Pinus Strobus*, *Pinus resinosa*, *Pinus rigida*, *Picea alba*, *Picea rubra*, *Juniperus Virginiana*, *Juniperus communis*, *Thuja occidentalis*, *Tsuga Canadensis*, *Ginkgo biloba*, *Larix Americana* and *Larix Europea* are the only handsome trees of these families which have shown themselves able to grow in this climate to a large size and preserve in cultivation here their mature beauty. All of these, with the exception of the *Ginkgo* and the *European Larch*, belong to our northern *silva*. In a second list may be placed *Abies concolor*, *Pseudotsuga taxifolia* and *Picea Engelmanni* of the Rocky Mountains, *Taxus cuspidata*, *Abies homolepis*, *Abies Veitchii*, *Picea Ajanensis*, *Pinus parviflora*, *Thuja Standishii* and *Sciadopitys verticillata* of Japan, *Pinus Koraiensis* of Corea, *Pseudolarix Kämpferi* and *Pinus Bungeana* of northern China, *Abies Nordmanniana*, *Abies Cilicica* and *Picea orientalis* of Anatolia. The trees in this second list all do well in the northern states, where they have been grown from twenty-five to fifty years, although none of them have been tried long enough yet to show their ability to thrive permanently here. In a third list of species promising in this climate, but still less tried than those of the second list, may be placed *Abies Sachalinensis*, *Pinus densiflora*, *Abies lasiocarpa*, the two Japanese Hemlocks, *Thuja plicata*, *Tsuga Caroliniana*, *Tsuga Pattoni*, *Picea Omorika*, *Larix Dahurica* and *Tumion nuciferum*. If these all succeed here the number of plants of these families which we can really depend on is still very small, and the permanent decoration of the parks and gardens of the north-eastern states will have to be largely made of broad-leaved trees, which flourish here almost as well as in any other part of the world, and of a comparatively small number of species of *Taxids* and *Conifers*.

C. S. S.

The Botanic Garden of Smith College.

A STUDY OF AN EDUCATIONAL ADAPTATION.

IT is plain to all who read the signs of the times that the present trend of botanical activity is toward the study of the phenomena of the life of plants. The facts of plant-structure, and of plant-relationships as suggested by resemblances of structure, have been relatively so well studied that for the present and near future the most attractive problems must lie in the investigation of the causes of structure. The plant static needs to be, and is being, explained by the study of the plant dynamic. But as investigation leads, so must education follow. For the systematic pursuit of physiology and ecology, however, a botanic garden with a well-proportioned greenhouse system is essential; and it is rapidly coming to pass that a college must provide these if it is ambitious to keep abreast of the general advance.

It is in this spirit that Smith College has established its Botanic Garden. As an attempt to realize with fair rapidity and minimum expense, a preformed plan which should express the optimum of adaptation to the present demands and indicated tendencies of botanical education, this venture is, perhaps, without exact precedent, and its results must possess, botanically and educationally, a far more than sectional interest.

The history of this Garden is very brief. In 1891 the trustees of the college, following the recommendation of President Seelye, to whose initiative and constant interest the Garden owes everything, decided to attempt to combine the beautifying of the college grounds with the formation of a scientifically planned botanic garden which should serve as an adjunct to the department of botany. Messrs. Olmsted, Olmsted & Eliot were engaged to draw up the plans, and in 1892 planting was begun. The next year a small greenhouse was built. In 1894 the position of Director of the Botanic Garden and Professor of Botany was established and an appointment made. Since then, though with large changes in the original plans made necessary for practical reasons, development has gone steadily on. Some progress has been made in the school of trees and shrubs; the herbaceous garden is nearing completion; the greenhouses are finished and stocked; the work of administration is systematized.

The college campus contains about thirty acres, including the space occupied by the nineteen buildings (see map on p. 513). It

is roughly quadrangular in shape, and, as to surface, consists of two nearly equal plains differing fifteen to twenty feet in elevation, the higher on the north-east, with a slope of varying steepness between. The soil is mostly poor. There were originally some fine trees on the grounds, and two or three good vistas and open spaces, and from several points there are beautiful views of the distant hills or over a little lake and the woods beyond. Happily, the campus is not a public thoroughfare. Except for the herbaceous garden and a large open meadow, the entire grounds are divided by imaginary lines into sections, each devoted to a single family of woody plants, and arranged in sequence according to the natural system of Bentham and Hooker. Within the limits of the family it is intended to group the trees and shrubs about the buildings chiefly for artistic landscape-effect. Naturally, development in this part of the Garden must be slow. None of the good trees or shrubs originally on the grounds will be disturbed, but all new planting will be made to accord with the new plans. Of trees and shrubs 276 species, in forty-five families, are now growing on the grounds.

In the north-west angle of the campus, and on the lower level, about two and one-half acres have been devoted to the herbaceous garden. It has four parts: (1) the systematic section, (2) the ecological section, (3) the greenhouses, (4) the propagating garden.

A systematic section must always form the centre of any complete botanic garden, for name and relationships are to botanists practically the most important things about a plant. The accompanying plan sufficiently shows the arrangement of this section, which follows the system of Bentham and Hooker, and aims to illustrate the systematically important families and genera, not of New England alone, but of the world. It now contains, along with the ecological section, more than 1,200 species, in seventy-eight families.

For the many plants which will not grow in open beds because they are fitted to a different situation, and that the principles of their adaptation to their particular habitats may be shown, it is necessary to supply those habitats. For this reason we have the ecological divisions. The pond is well stocked with water-plants selected to show the different ways in which plants overcome the drawbacks of that mode of life. A bog is being prepared for bog and marsh forms. The rockery is completed and wellstocked with alpine and other rock-dwelling species. Behind the greenhouses a grove of native trees and shrubs has been started in which the shade-loving plants are to be placed. Desert plants will have a place on the sunny bank near the rockery, and strand plants will ultimately be present also. In addition to the ecological groups, there are important principles, needing illustration, of adaptation to particular modes of nutrition, exposure to light, the climbing habit, protection, movements, locomotion (dissemination and pollen-transfer), etc. For these, and for illustrating principles of form and color, a series of beds will be made along the space reserved for the purpose west of the rockery. An economic section has not yet been arranged for, though in a complete botanic garden it should be present. The shrubs which have a place in the herbaceous section are all of special educational interest.

The greenhouses stand in a sheltered corner with a high terraced bank on the north and east. They are a gift to the garden from Mr. E. H. R. Lyman in memory of his mother. They are built and equipped in the most thorough and modern manner. Their divisions are, of course, primarily climatic, but within each there is an attempt at an ecological arrangement. The Warm Temperate House (18 by 42 feet, inside measurement) contains, in addition to plants proper to that climate, a raised tank, eight feet square, in which principal types of water-plants are constantly growing, and a grotto or rock-work, over which water is always trickling, for Liverworts and similar amphibious forms. The Tropical House (18 by 35 feet) contains special collections of Orchids, Begonias and Ferns, with other smaller tropical types. The Palm House (50 by 35 by 25 feet high) is the best furnished and most attractive of the range. Its chief feature is the great central bed in which selected types of larger tropical vegetation—Palms, Bamboos, Figs, Dracaenas, Musas, Crotons, Aroids, Ferns—are growing directly in the earth, and form a jungle instructive of many principles of adaptation. The great success of this bed illustrates the value of planting out large plants wherever possible. Other collections in this house are the climbers, Nepenthes, Bromeliads, all chosen for principles which they illustrate. The Acacia and Cactus House (17 by 18½ feet) is filled with forms to show relations to the desert habit. The Cool Temperate House (18½ by 33 feet) contains forms of our own latitudes, and in it large quantities of materials are raised for elementary instruction. In it also is another tank, a group



THE BOTANIC GARDEN OF SMITH COLLEGE

1897

of Sarracenias, and later are to be added halophytes and alpinas. The Experiment House (18½ by 33 feet) is chiefly devoted to the practical study of plant physiology by the advanced students. Here a practicum is carried on in which each student works through a series of experiments upon the nutrition, growth, irritability and other vital operations of plants. The laboratory is used by them in this work. A Propagating House (5 by 66 feet) and the workroom, with the boilers beneath, complete the series. This brief sketch does but scant justice to the botanically and educationally interesting contents of the houses. It is difficult to estimate the number of species in them, but it will give some idea to state that they contain 28 species of Palms, 15 of Aroids, 16 of climbers, 15 of economic plants, 56 of Ferns, 8 of Sensitive plants, 78 of Cactaceæ, 37 of Acacias, etc., 20 of Aquatics, 15 of Insectivora, etc. It is not, however, accumulation, but selection, which is the guiding principle here as throughout the Garden.

In practice this arrangement of the houses in parallel series has proved both economical in heat and labor, and convenient for study, and can be strongly commended. There is but one change needed, a larger cool greenhouse, for the present one is too small. In time the Experiment House will be taken for this purpose and a new house and laboratory built on a space reserved along the north of the present range.

The Propagating Garden contains the usual equipment of frames, bulb houses, etc.; in it plants are grown on for winter-flowering, and woody plants for the School of Trees and Shrubs.

A great element in all adaptation is size. This Garden is not for the public, nor even for University work (which Smith College only permits and does not encourage), but is intended for the botanical education of a growing college of about a thousand undergraduate students. This, and economy, have made the Garden the size it is, and it is believed to be ample for a long time to come. The relatively large size of the greenhouses is made necessary by the nature of the American college year, with a winter session and no summer session. Such houses as these, since they allow the study of living plants to be carried on practically regardless of season, both permit the arrangement of the botanical courses upon the best educational principles, unhampered by the usual practical difficulties, and also allow of constant improvement, through experiment, in the providing of the most illustrative materials, in the best condition, for the most thorough, vivid and economical instruction of the different grades of students. It is plain that efficiency in these respects presupposes a gardener of special and unusual qualifications; such is our head-gardener, Mr. E. J. Canning, to whom most of the success of the Garden is due.

Of great importance to any American college contemplating such an equipment is the question of cost, which in this case also has had to be considered with great care. Since the grounds of a college must be kept in good order in any case, and their improvement ought to go steadily on, the additional cost of developing them on a botanical system is not great, and the chief expense is in the care of the herbaceous garden and greenhouses. The winter force in this Garden consists of a head and second gardener, aided by about half of the time of one laborer; the summer force consists of the two gardeners, with from three to four laborers. Materials for stocking garden and greenhouse are, thanks to the generosity of the older gardens of Harvard, Washington and St. Louis, readily obtainable as gifts, or else may be chosen from the exchange seed-lists of the gardens of Europe. Following their example, this Garden issues an annual exchange list, which is sent to all of the great gardens of the world, for which theirs are received in return. During the past year we received from other gardens 744 packets of seeds, all we could use, selected from 23 seed-lists, and in return sent out 1,368 packets selected from our own by thirty gardens, nearly all European. Another question of cost often raised is as to the profit of maintaining a garden when college is not in session at its best time. The answer is, first, if a garden is wanted at all, its maintenance through the summer must be reckoned as a part of its cost, and, second, it is more useful in summer than it seems. The blossom is not always the important part of the plant, nor is the study of flowers all of botany; it is possible within certain limits to select forms which blossom early and late; summer-blooming materials may now be cheaply and well preserved in formaline for winter use; and finally, summer schools may fully utilize the summer condition of a garden.

Although in this sketch the botanical or educational aspect of the Garden has had first place, it is not to be inferred that its æsthetic side is neglected. Plants for beauty as well as plants for use stand in our beds and houses and are open to

all. The Garden is yet too new, and in some respects too incomplete to have ripened to full beauty. But in time and with constant growth, it may yet come to pass that there will gather about the gardens of Smith College something of that charm which makes the gardens of Oxford almost sacred ground, where all that is dearest to vigorous and scholarly youth is associated with all that is most beautiful in man's friendship with Nature.

Northampton, Mass.

William F. Ganong.

Plant Notes.

The Fruit of Sequoia.

IN *The Silva of North America* the fruit of Sequoia is described as maturing during the first season, although both Engelmann, in *The Botany of California*, published in 1880, and Masters, in *The Journal of the Linnean Society* (xxx., 22), published in 1895, stated that it did not mature until the second season. It is now evident, however, that the statement in *The Silva* was based on the study of insufficient material, and that so far, at least, as Sequoia Wellingtonia is concerned, the fruit does not ripen until the second season. This fact has been pointed out to me by Miss Alice Eastwood, the curator of the herbarium of the Academy of Sciences of California, who has made a careful investigation of the subject, and in a recent letter says: "I think that this is what happens. The trees bloom early, probably in February or March, and the cones grow during the following summer and, perhaps, also during the winter. The next spring they are of mature size and the seeds are ready to germinate. The cones open during the following summer, in August or September, after the hot, dry season." To Miss Eastwood, too, I am indebted for the specimens which show the accuracy of her observations, and which are reproduced in Mr. Faxon's drawing on page 515 of the present issue.

So far as I have seen there is no reason to believe that the second species, the type of the genus, Sequoia sempervirens, does not mature its cones in one season.

C. S. S.

Notes on the Botany of some Southern Swamps.

THE following notes were gathered the past summer during a journey especially devoted to collecting and studying the plants of swampy regions in the states of Missouri, Arkansas, Louisiana, Mississippi, Alabama and Florida.

Leaving St. Louis on the night of July 27th, I arrived at Little Rock, Arkansas, early the next morning, and at sunrise heard the shrill cries of mocking-birds as they left the trees where they had passed the night, announcing, as well as the appearance of Cotton in the fields, the Grape Myrtle and Pride of India trees in the yards, and the Paper Mulberries in the streets, that I was entering the sunny south. The principal indigenous plants observed near the banks of the Arkansas River at this place were the Willow Oak, Spanish Oak, Cow Oak, Catalpa, Sweet Gum, Cassia occidentalis, C. Tora, Jussiaea decurrens, Rhexia Mariana and Hibiscus lasiocarpus. As my object was to study the swamp flora, I did not attempt to make a collection here, but proceeded to Alexandria, Louisiana, noting as good collecting points Varner, Arkansas, and Mer Rouge, Louisiana, for the return trip.

On reaching Pine Bluff, Arkansas, I found that Albizzia Julibrissin was common in cultivation, and that Sabal Adansonii was abundant in low woods along the Arkansas River. Big trees became common from Walnut Lake, Arkansas, southward. Hicoria aquatica, Aralia spinosa, Populus heterophylla and Sesbania macrocarpa are very common beyond Pine Bluff, Arkansas, while the Long Moss (Tillandsia) became conspicuous at Parkdale, Louisiana. Passing through Alexandria and reaching Melville, Louisiana, I found Fraxinus pubescens, var. lanceolata, Brunnichia cirrhosa and Quercus lyrata common in the swamps. Here I paid little attention to the upland flora,

the main object of my journey being to collect swamp specimens and to make special search for *Leitneria Floridana*, and an Ash-tree which I had found several years ago in the swamps of south-eastern Missouri, and described as *Fraxinus America profunda*.^{*} Later studies and observations have shown that this tree is abundantly distinct from the White Ash and from all other species of the genus, and I now propose to give to it full specific rank as *Fraxinus profunda*, under which name it will appear throughout these notes. Believing that these two plants would be found at many stations between Missouri and Florida, I watched for them carefully throughout the trip, with what success the reader will learn later.

Leaving Melville, I went to Bayou Goula, Louisiana, but as the bayou was as dry as the streets of St. Louis I did not stay there long, but went on to White Lake, where there is a large Cypress swamp, which I examined thoroughly, failing, however, to find any *Leitneria* or *Fraxinus profunda*, although the Green Ash was present in goodly

I gathered specimens of a fine *Clematis* in fruit, which appears to be undescribed.

Leaving the Chattahoochee River, I went down the Apalachicola, looking with reverence on *Tumion taxifolium* and *Taxus Floridana*. Arriving at Apalachicola, I visited, in company with Dr. Chapman, the St. Mark's branch of the Apalachicola, where Dr. F. Roth found early last spring *Fraxinus profunda*, and when Dr. Chapman showed me what he had called the Red Ash I was pleased to recognize the species I was looking for. The fruit had already fallen, but I took a few leaf specimens that I might record the locality. The trees here were small, being only from twenty to thirty feet in height, with trunks swollen at the base, as I had found them in Missouri. Here I saw magnificent Cabbage Palms at least fifty feet in height, their tall wide-leaning trunks standing out in bold relief against a background of Swamp Hickories, Pecans and other deciduous-leaved trees. Near the margin of the river dwarf Palmettos flourished with great clumps of *Rhyncospora*



Fig. 66.—*Sequoia Wellingtonia*.—See page 514.

1. A young cone, gathered in July. 2. A fruiting branch of the same year, gathered in October. 3. A mature open cone of the previous year, gathered in October.

numbers. Here I first saw the French Mulberry (*Calli-carpa Americana*), with its attractive bright reddish purple fruits; and here also I made the acquaintance of the beautiful *Aspidium patens*, which covers with tall graceful fronds the higher parts of this swamp.

Leaving White Castle, I went on to Orleans without seeing any suitable place to stop on my return, and then proceeded to Mobile, Alabama, passing several days at Spring Hill, in southern Alabama, collecting with Dr. Mohr, who introduced me to a number of the most interesting southern plants. On the borders of swamps in this region I was surprised to find the Crape Myrtle, the Pride of India, *Albizia Julibrissin* and *Zizyphus Jujuba* thoroughly naturalized. Leaving this most delightful collecting-ground, I passed on to Florida to seek for the two trees on the Chattahoochee River, stopping on my way to examine several swamps along the route without finding anything of importance until I reached the Chattahoochee River, where

corniculata and its variety *patula*. Associated with the beautiful Mallow, *Kosteletzkya Virginica*, and the fine leguminous plant, *Vigna luteola*, a few specimens of *Leitneria* were also observed; they were, however, quite small with narrow leaves. At Apalachicola I examined the marshes north of the town, finding there another clump of *Leitneria*, the plants being larger than those which I had seen on the St. Mark's River, and a broad-leaved Willow which appears to be undescribed. I was much elated on finding here some handsome leguminous plants with fine large scarlet flowers, which proved on examination to be *Daubentonia longifolia*, which has become introduced into waste places and is spreading along roadsides. Returning from Apalachicola I went to the Chattahoochee River and Spring Hill, Alabama, and then homeward by the way of New Orleans and Alexandria without seeing any further signs of *Leitneria* or *Fraxinus profunda* near these places.

Going on to Mer Rouge, I found the White Ash common in that locality, this being the first place in which I had noticed it. There was no sign, however, of the Green Ash,

^{*} Ann. Rep. Missouri Bot. Gard., v., 147 (1894).

-which is common from south of Mer Rouge to New Orleans. Here I saw also the common Papaw, which I had not observed further south. Leaving Mer Rouge, I went to Varner, Arkansas, where I spent two days in examining the country near the railway station. Here I observed the French Mulberry in abundance, and also the White Ash. The second day I went some distance into the lowlands, across Cypress Creek, and here I found *Fraxinus profunda* in great quantities, besides plenty of Green and White Ashes. I examined several hundred trees of *Fraxinus profunda*, but could not find any fruit, although I secured good leaf specimens, as well as those of *Leitneria*, which is also abundant here. My guide told me that the people in the neighborhood called *Fraxinus profunda* Pumpkin Ash on account of its being swell-butted, a character which I had already noted in the trees in Missouri. This Ash grows here to a height of one hundred feet, with a trunk eighteen inches in diameter, and is larger and better developed and more abundant than I have seen it elsewhere. The *Leitneria* was also larger than at Apalachicola, being here about twelve feet in height, with stems nearly four inches in diameter. The Arkansas River is only six miles distant from this point, and although I examined the country carefully the next day I did not see either a Pumpkin Ash or *Leitneria* on its banks.

Leaving Pine Bluff, I went next to Marked Tree, Arkansas, where I fully expected to find both *Fraxinus profunda* and *Leitneria*, as this place is at the junction of the St. Francis and Little Rivers, on which further up in Missouri I had collected the two trees. I was disappointed however, in not finding either of them. Leaving Marked Tree, I went to Papaw Junction, in New Madrid County, Missouri, where I found the *Fraxinus profunda* in abundance, and where it is almost the only Ash. Here the trees were in splendid fruit. At this point the Green Ash appears to be rare, and, on account of the exceedingly dry season and the draining of the overflow of Little River by a new canal, the fruits of the Pumpkin Ash were remarkably small here, still showing, however, the characteristic form which first attracted my attention.

I saw no *Leitneria* at Papaw this year, although when I was there two seasons ago I was told that it grew in the neighboring swamp. This is probably true, as the conditions for it are exactly right. The Pumpkin Ash here is a rather medium-sized tree, growing to a height of about fifty feet, with a trunk a foot in diameter. I am of the opinion that the regions of the greatest abundance and largest development of the Ash and the *Leitneria* are somewhere in the vicinity of Big Lake, that is, in south-eastern Missouri and north-eastern Arkansas.

Courtney, Mo.

B. F. Bush.

The Forest.

The Shasta Fir (*Abies Shastensis*).

AMONG the conifers of the Pacific coast, two Firs, *Abies nobilis* and *Abies magnifica*, have long been a hard knot for botanists. *Abies nobilis* was described in 1833, *Abies magnifica* in 1863, and after various bibliographical vicissitudes, during which the real distinctness of the two was seriously questioned by the highest botanical authorities both in the United States and Great Britain, the essential distinctive character of the species was considered by Dr. Engelmann in 1878* to be the exserted bracts on the cones of *A. nobilis*, a tree of the Cascade Mountains of Oregon, and the included bracts of *A. magnifica*, a tree of the Sierra Nevada of California, a position he still maintained in 1880.† Two years later, however, after a trip through Oregon and California with Professor C. S. Sargent, he expressed the opinion that the real differential mark of the two trees was the grooved leaf of *A. nobilis* and the two-keeled leaf of *A. magnifica*.‡ Now, on Mount Shasta, which is inter-

mediate in geographical position between the Cascades and the Sierra Nevada, occur large forests of a Fir with two-keeled leaves and exserted bracts. In the light of his earlier opinion Dr. Engelmann considered this tree a form of *A. nobilis*, but afterward, in the light of his later opinion, a form of *A. magnifica*.

In 1890 Mr. J. G. Lemmon took the matter up, following Dr. Engelmann's later view that the grooved leaf constituted the real character of *A. nobilis*, and ventured to describe the Mount Shasta tree as a variety, *Shastensis*, of *Abies magnifica*; and in May of the present year he published it as a distinct species, *Abies Shastensis*.

During the past summer the writer, in company with Mr. Elmer I. Applegate, of Klamath Falls, Oregon, had ample opportunity, on a journey from end to end of the Cascade Mountains of Oregon, to examine both *A. nobilis* and *A. Shastensis*. As no botanist has made this trip before, many new facts regarding the geographical distribution of plants were observed, and among other interesting things, the most of which must be deferred for later publication, the rather startling discovery was made that the bracted Fir abundant in the Crater Lake region and for nearly a hundred miles toward the north along the Cascades, is not *Abies nobilis*, as has heretofore been supposed, but is in reality *Abies Shastensis*.

We entered the Cascade Mountains from the east at a point about fifteen miles north of the Oregon-California boundary, and turning northward from Buck Lake toward Lake of the Woods, we came upon the Shasta Fir near the summit of the divide between these two lakes at an elevation of a little more than 5,000 feet. On the following day, traveling south-westward from the Lake of the Woods about two miles on the Dead Indian Road we found the tree again, on the summit of a divide of about the same altitude as the other, and probably continuous with it. These two localities, about twelve miles south-east of Mount Pitt, are situated near the point where the great Cascade Range breaks down, being separated from Mount Shasta, sixty miles to the south, by a broad gap through which the Klamath River flows oceanward from the elevated plains of the interior.

From these first localities we observed the tree northward along the Cascades at points of suitable elevation as far as the mountain immediately south of Davis Lake, one of the reservoir sources of the Deschutes River, about latitude forty-three degrees thirty-five minutes. The tree has been reported by Mr. Lemmon as occurring also westward from the Cascade-Shasta gap in various smaller ranges toward the sea, including Mount Eddy, the Trinity Mountains, Scott Mountains and the Siskiyou Mountains, all except the last lying wholly south of the Oregon-California line.

The individual localities at which we saw the tree in addition to the first two already cited, are in detail as follows: Sparingly about the base of Mount Pitt, in the vicinity of Four-mile Lake, and for three or four miles down the stream that forms its outlet; abundant along the upper part of Anna Creek Cañon to Crater Lake and down the Rogue River road on the western slope of the mountains to Whiskey

first, apparently, to bring this leaf distinction prominently before botanists, especially as a key to the difference between true *nobilis* and the Mount Shasta tree, that this leaf character had been advanced as early as 1875 (*Gardeners' Chronicle*, page 754) by Mr. Syme, the London nurseryman, as a means of distinguishing *nobilis* from *magnifica*. In the note, written by Andrew Murray, in which this character is announced there is an evident hesitation to assert its constancy. The note reads, "There are a great many plants in this country (Great Britain) which have always been considered *Picea nobilis* (now *Abies nobilis*), which have been bought as *P. nobilis*, which have been raised from seed sent home to Great Britain as *P. nobilis* which yet have tetragonal leaves. I anticipate Mr. Syme's answer to this objection, that *P. magnifica* has been confounded with *P. nobilis* in its native country (the north-west coast of America), and that these plants with subtetragonal leaves are really *P. magnifica* raised from seed sent home as *P. nobilis* by mistake." This suggested solution of the difficulty is undoubtedly correct in the main, but the trees cultivated in Great Britain under the incorrect name *Abies nobilis*, having tetragonal or two-keeled leaves, may be not *magnifica* alone, but some of them *Shastensis*. The original importation of seeds by David Douglas in 1830, was, of course, true *nobilis*. John Jeffrey's importation, in 1851-53, was a failure, as none of his seeds grew. The seeds sent by William Murray and A. F. Beardsley a few years later reached Great Britain in good condition and were successfully grown, but none of these could have been *A. nobilis*, for that tree does not grow in the region in which they got their seeds. All the trees grown from this importation must be either *magnifica* or *Shastensis*.

* Engelmann, *Trans. St. Louis Acad.*, iii., 602 (1878).

† Engelmann in Brewer and Watson, *Bot. Cal.*, ii., 119 (1880).

‡ Engelmann, *Bot. Gazette*, vii., 4 (1882). I find that while Dr. Engelmann was the

Creek; abundant on Huckleberry Mountain; sparingly on a mountain spur between Crater Lake and Diamond Lake; abundant on the slopes of Mount Thielson and Old Bailey; occasionally along the trail from Diamond Lake northward into the headwaters of the Umpqua; abundant on the south slope of the Calapooia Mountains near their junction with the Cascades, and sparingly on their north slope; occasionally on the lower slopes of Diamond Peak, between Summit and Crescent lakes, and on the lower divide between the latter and Odell Lake; and lastly, on the mountain east of Odell Lake and south of Davis Lake. At this point we turned eastward away from the main mountain chain, but the tree doubtless occurs at least a few miles farther north.

In the Cascade Mountains the Shasta Fir belt has an elevation of from 5,000 to 7,000 feet and the tree is usually associated with *Tsuga Pattonii*, growing chiefly in the lower part of the *Pattonii* belt, but it often also crosses the *Pinus Murrayana* belt and sometimes overlaps on its lower side the uppermost edge of the *Pinus ponderosa* belt.

In its best development, as, for example, on Huckleberry Mountain and near the summit of the Fort Klamath-Rogue River Road, it is a superb tall tree of magnificent proportions, easily the queen of the forest. Its common height is from 150 to 200 feet and its trunk diameter three or four feet. The trunks of two large, but by no means extraordinary trees near the lower camping-ground at Crater Lake measured fifteen feet seven inches and fifteen feet eight inches in circumference about four feet from the ground. The crown of a mature tree is narrowly oblong in outline, usually equaling from one-half to two-thirds the total height of the tree, supported on a straight, only slightly tapering, branchless trunk, from forty to seventy-five feet in height. The bark is of a reddish gray color on the outside, is regularly and rather deeply fissured, and within has the color of Hemlock-bark in alternating layers of dark red and reddish brown. The branchlets are extremely symmetrical in their ultimate ramifications, so that one standing beneath a tree can always distinguish it by this feature alone from *A. lasiocarpa*, *concolor*, *grandis* or *amabilis*. The large cones, described in detail below, sit erect upon the branches, and are continually suggestive of little owls.

In general appearance trees of *Abies nobilis* and *Abies Shastensis* are to me indistinguishable, though a more intimate acquaintance with them might discover some gross differences. The cones of the two trees, though very similar, can always be distinguished by one familiar with both. The cone of *A. nobilis* is the slenderer of the two, measurements of the specimens of five collectors giving an average length of 133 millimeters, and an average thickness of fifty-seven millimeters, giving a ratio of 2.33—in short, a typical, well-developed cone is noticeably more than twice as long as broad. In *A. Shastensis*, cones from six different places give an average of 131 millimeters in length by seventy millimeters in breadth, a ratio of 1.87, indicating that they are usually a little less than twice as long as broad. The cone scales of *A. Shastensis* are usually from thirty to thirty-five millimeters broad and the seeds about thirteen millimeters long, these measurements in those of *A. nobilis* being about twenty to twenty-five millimeters and ten millimeters, respectively. In external appearance the cones differ also in another way. The exposed portion of the bract is usually longer and more inclined to be obcordate in *A. nobilis*, and is abruptly reflexed and appressed to the surface of the cone, thus usually completely covering the scales. The awns of the bracts, above the marginal serrations, are commonly five to seven millimeters long. In *A. Shastensis* the awn is two to three millimeters long, and the shorter exposed part of the bract, seldom retuse at the apex, is rather loosely recurved, so that a considerable portion of the surface of the cone is commonly visible.

Probably the best diagnostic character of the tree, however, is in the leaves. Unfortunately, good series of the lower leaves of the two species are not accessible, but those of the upper branches, broken dead twigs from which can

almost always be found underneath the trees, have been examined in quantity. In both species these leaves are thick, stiff, upwardly curved, keeled on the lower surface, and often, especially on cone-bearing branches, sharp-pointed. On the upper surface of the leaves of *A. nobilis* there is, however, a sharply defined, narrow groove, while in those of *A. Shastensis* the upper surface is keeled like the lower, the cross-section therefore being rhomboidal like that of a *Picea*. The groove in the leaf of *A. nobilis* does not always reach all the way to the apex, and sometimes in the leaves situated along the middle of the upper surface of the twig, and therefore without lateral curvature, it is entirely wanting, but in the outside leaves of the twig it is invariably present.

Abies nobilis is primarily a tree of the Cascade Mountains, the locality best and longest known for it being Mount Hood. It has been known for several years to extend as far north along the Cascades as Mount Ranier, and now it is reported by Mr. A. J. Johnson, of Astoria, Oregon, as occurring on Mount Baker in extreme northern Washington, close to the British boundary. Southward along the Cascades in Oregon we found it as far as Browder Ridge, on the northernmost headwaters of the Mackenzie, an affluent of the Willamette. This is about fifty miles north of the northernmost point at which we found *Abies Shastensis*. Our route between these two points lay wholly on the eastern slope of the Cascades, but examination of the western slope in this region will undoubtedly show that the range of the two species approaches much more closely, if they do not, indeed, actually meet. Mr. Johnson has also reported it from the coast mountains of south-western Washington.* The tree grows here, I am informed by Mr. B. E. Fernow, at an elevation of usually 1,500 to 3,000 feet, sometimes extending as low as 500 feet, as, for example, on the north slope of the divide between Grays River and Skamokawa River, about four miles from the sea.

By a strange misapplication of names, the history of which I do not know, the name Larch is applied by the lumbermen of Washington and Oregon to both *Abies nobilis* and *Abies Shastensis*, but I could find no evidence that the two are distinguished by them. Both are considered valuable for lumber, though from the high elevation at which they grow, and their consequent inaccessibility for the most part, neither has as yet come into the lumber market in large amount.

Though it is several years since I had the opportunity of observing *Abies magnifica* in the high Sierra Nevada of California, I recall it as a tree of the same magnificent proportions as *A. nobilis* and *A. Shastensis*, with the same deep red color of the bark within and the same geometrical regularity of the twigs. From an examination of abundant herbarium material I coincide with the view expressed by Dr. Engelmann and implied by Mr. Lemmon that it is with this tree rather than with *A. nobilis* that *A. Shastensis* is the more intimately related. Indeed, in size and relative dimensions of the cone, in the size of the scales and seeds, and in the character of the leaves the two seem to be indistinguishable, the only tangible character being the conspicuous one of protrusion or inclusion of the bracts on the cone-scales. Intergradation is not to be expected between *A. Shastensis* and *A. nobilis*, though it may hereafter be found between *A. Shastensis* and *A. magnifica*.

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C. V. Coville.

Recent Publications.

Insect-Life: An Introduction to Nature-Study and a Guide for Teachers, Students and Others Interested in Out-of-door Life. By John Henry Comstock. New York: D. Appleton & Co. 1897.

In this admirable text-book the needs of the beginner in

* *Abies nobilis* was found in August, 1896, in the valley of the Selduc River on the northern slope of the Olympic Mountains in Washington, by Professor Sargent, and was also noticed by Dr. E. Hart Merriam during the past summer in the same locality.

the study of insects have been kept constantly in mind. Although carefully adapted to the teaching of children, the book is intended for adults as well, and it would be hard to find a better introduction to entomology. The treatment of the subject results from the extensive experience of the author in teaching, and commends itself by constantly inducing personal observation, the development of this habit being one of the greatest benefits derived from such study. Part i. outlines a course of study, beginning with a series of carefully graded lessons based on material easily obtained in any part of the country, a locust being selected for the study of the parts of the body. After this knowledge has been acquired the student begins out-of-door study, and is taught about the metamorphoses of insects. The classification of insects and their near relations is then considered, and is treated in a concise and effective way; indeed, it would be hard to find a clearer exposition of the subject. A series of chapters follows on pond-life, brook-life, orchard-life, forest-life and roadside-life, in which typical insects in all the orders are taken up and treated in a simple and clear manner wholly admirable. These chapters are profusely illustrated with wood-cuts of the highest class, the figures (by Mrs. Comstock) being, in fact, one of the notable features of the work. Part ii. treats of the collection and preservation of specimens, and gives complete directions how and when to collect, how to preserve and label, and as to the different methods of breeding insects in confinement. The closing chapter is devoted to a list of some of the most useful books for beginners in entomology.

In every way the book seems to us praiseworthy and a fitting companion to the author's *Manual for the Study of Insects*.

Bird-Life a Guide to the Study of Common Birds. By Frank M. Chapman. New York: Appleton & Co. 1897.

The success achieved by the *Handbook of Birds of Eastern North America* leads one to expect much pleasure from the examination of another book by the same author, and this expectation is fully realized in the case of the volume before us. Beautifully printed, and illustrated by so competent an artist as Mr. E. S. Thompson, it appeals at once to the eye, and the worthiness of this appeal is confirmed by a study of the contents. The care and thought bestowed on its planning and execution have resulted in one of the best text-books ever published on that most fascinating department of Natural History—bird-life. Ornithology in this country has a record of which we may be proud indeed. Raised at once to the highest excellence by the genius of Wilson and Audubon, it has found worthy followers down to the present day, who have maintained the high standard set by them.

The steadily increasing interest in the purely popular side of the subject has been ably met by the publication of such books as the one under consideration. These books deserve the highest praise in giving to the public with absolute accuracy the results of the latest scientific knowledge. To present such knowledge in well-ordered form is a task of no little magnitude, and when, as in this instance, it is conscientiously performed, it deserves our sincere applause. The book is not addressed to professional ornithologists, but to those who desire a general knowledge of bird-life and some acquaintance with our commoner birds. The earlier chapters deal with the place of birds in Nature and their relation to man, and outline the leading facts in their life-histories. The concluding chapters describe 100 or more of the more familiar species of eastern North America and give figures of most of them, many of these ranking among the best bird portraits we have. Such figures as the downy woodpecker, phoebe, field sparrow and veery are exquisite. Throughout the volume there is everywhere evidence of care and judgment, and the reader is impressed on every page by its trustworthiness. In short, the merits of the book are of the highest order.

Notes.

The American Forestry Association will hold a popular meeting at Tampa, Florida, in February. Dr. B. E. Fernow, Chief of the Division of Forestry, will deliver an address on National Forest Reservations and Their Management.

From the recent report of the Parks Committee of the London County Council it appears that 208 open spaces, each less than ten acres in extent, with an aggregate area of 366½ acres, are now open in London for the enjoyment of the public.

Mr. Horatio N. Rust, of South Pasadena, California, reports an interesting case of the effects of natural root-grafting noticed by him on the Sierra Madre Mountains, where he has found that a stump of a tree of *Pseudotsuga macrocarpa* a foot in diameter, and cut down about thirty years ago, has continued to live and that a layer of wood and bark has formed over the entire top without the assistance of leaves from the stump itself.

By act of Legislature of the state of New York the College of Agriculture of Cornell University is empowered to conduct University Extension work in agriculture in this state. Scientific knowledge effecting practical agriculture is thus brought into the farmer's home in a popular and reliable form. A class which now numbers several hundreds is engaged in a course of reading in some of the fundamental principles of agriculture. Those wishing to join the class should address Professor I. P. Roberts, at Ithaca, New York. Printed matter for study is sent to applicants free of charge.

A correspondent sends us a beautiful photograph of *Rhododendron Catawbiense* at Balinie, Scotland, described as being over twenty feet in height with a spread of branches, which rest on the ground, 172 feet in circumference. This remarkable plant is about 100 years old and in still vigorous health, as is shown by the thousands of flower-clusters with which it was covered when the photograph was taken. This must be one of the oldest specimens of *Rhododendron Catawbiense* in Europe, and it is particularly interesting because it has grown to a size many times larger than this species ever attains on the mountains of Tennessee and Carolina, which are its natural home.

In the Proceedings of the California Academy of Sciences (third series, vol. i., part 2) Miss Alice Eastwood, curator of the herbarium of the Academy, distinguishes and figures under the name of *Iris Purdii* the beautiful *Iris* common in the Redwood region of Mendocino County, which has heretofore been confounded with *Iris Douglasiana*, which it resembles in its narrow red-based lanceolate spreading leaves and cream-colored flowers. From that species, however, it differs in its larger flowers, in its lighter green, less distinctly nerved, stiffer and often glaucous leaves, broader stamens and shorter, broader capsules. This *Iris*, which we believe has been successfully flowered by Max Leichtlin in his garden at Baden-Baden, is named in honor of our correspondent, Carl Purdy, of Ukiah, who first noticed and called attention to its peculiar characteristics.

With the present issue, which completes the tenth volume, the publication of GARDEN AND FOREST ends. For ten years the experiment has been tried of publishing a weekly journal devoted to horticulture and forestry, absolutely free from all trade influences, and as good as it has been possible for us to make it. This experiment, which has cost a large amount of time and money, has shown conclusively that there are not persons enough in the United States interested in the subjects which have been presented in the columns of GARDEN AND FOREST to make a journal of its class and character self-supporting. It is useless to expend more time and money on a publication which cannot be made financially successful, and must, therefore, sooner or later cease to exist.

Mr. J. H. Griffith, room 106, Tribune Building, New York, is authorized to receive money due to the Company, and to attend to any other business matters which may arise in winding up its affairs.

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